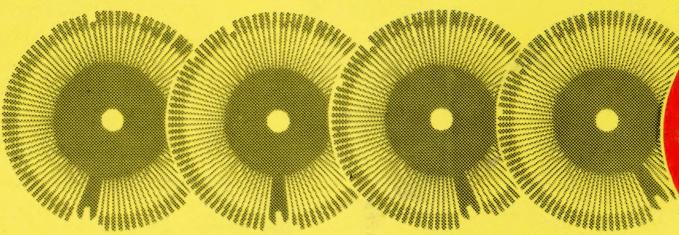
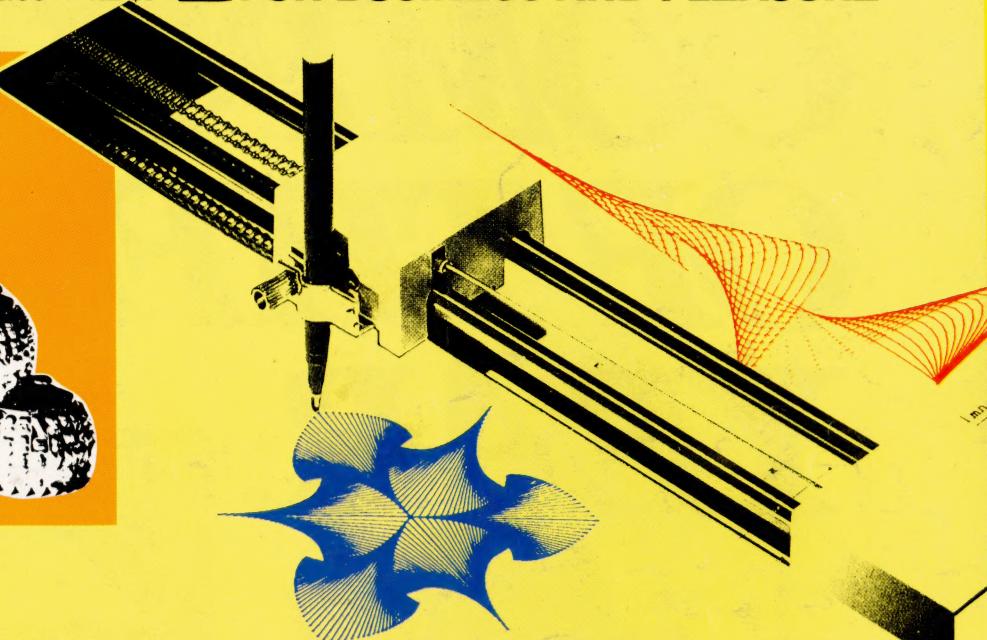


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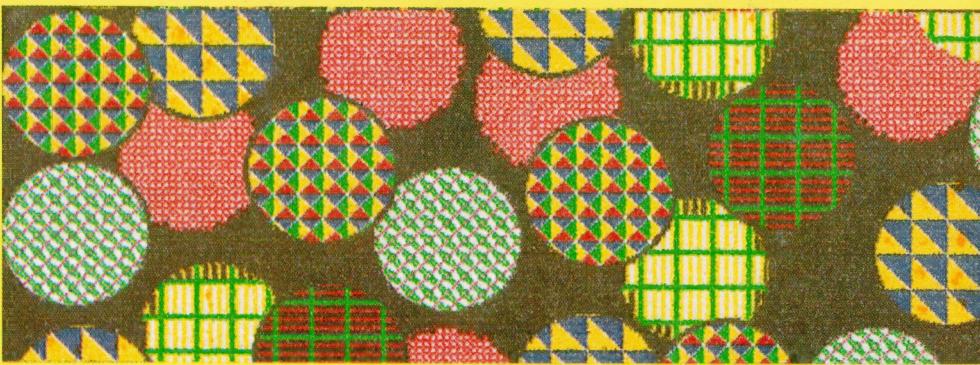
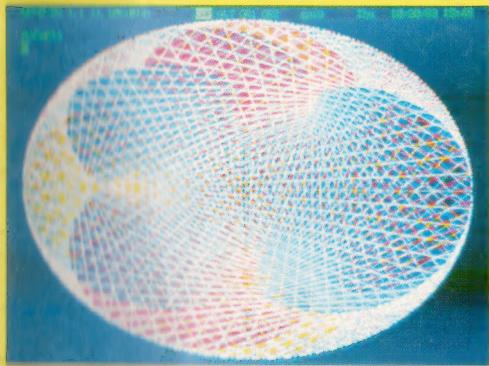
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Operating Systems

CP/M-86 Version 1.1	(A)
MS-DOS Version 2	(A)
P-SYSTEM Version 4	(A)
Languages	
R.M. COBOL	(A)
C/BASIC-86	(B)
C.B.-86	(B)
PASCAL MT+/86	(B)
CIS/COBOL 86	(C)
DRI C 86	(C)
PL/I-86	(B)
SSS FORTRAN 86	(C)
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CONTROL-C BASIC	(C)
SUPER SOFT C 86	(C)
PASCAL/M 86	(C)
JANUS/ADA 86	(B)
Computer Innovations C 86	(B)
MS-BASIC	(B)
MS-BASIC COMPILER	(B)
MS-BUSINESS BASIC COMPILER	(B)
MS-PASCAL	(B)
MS-FORTRAN	(B)
MS-C	(B)

Telecommunications

I.E. Asynch-86	(A)
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I.E. Bisync - 80/3270	(A)
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Word Processing

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Benchmark Telecommunicator	(A)
Benchmark Mail List Manager	(A)
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Spellstar-86	(B)
Spellbinder-86	(B)

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MS-Multi-Tool Budget	(B)
MS-Multi-Tool Financial Statement	(B)
Masterplanner	(C)

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IMS (Ascent) & (Executive)	(B)
Davidson	(B)
I.A.L.	(B)
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The Archives P.C. has a clear 80 column display format. A television interface is provided. The 40 column mode displays bold characters for easy vision on most TV sets. The optional 80 column monitor provides high quality display for office or home use.

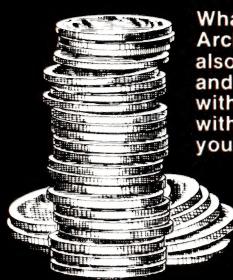
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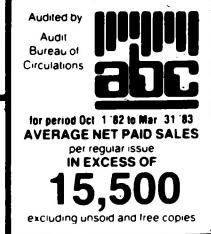
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**Special****20****Everything You Always
Wanted To Know****About Printers ...**

While you can't do much without one, printers can be very frustrating – and expensive – components of a computer system. Our comprehensive article takes you through types of printers, interfacing, methods of operation and how to choose the right printer for your needs.

84**Special Printer Offer**

Two top-quality Texas Instruments printers are being offered at over 30 per cent off their normal retail price! Don't miss the chance to complete your system at a bargain price!

87**10ACC Report**

Les Bell went to the Tenth Australian Computer Conference in Melbourne and came back with boggling eyes and sore feet. He tells us all about it in this issue ...

news**8****Your Computer News**

All that's new, innovative, inventive and imminent, in all areas of the microcomputer industry.

features**60****Basically Speaking, Burt – Your Days Are Numbered**

Carol Quigley reports that hands-on experiences with her computer system are the greatest thing since Burt Reynolds ...

95**A Tale of Three Modems**

At last – the long-awaited re-

view and discussion on three recently released modems in Australia. Bill Bolton looks at the Datasat World Modem, Modem Technology's UDM 1200, and Centre Industries' Cicada modem.

107**Microbee Graphics****Part 1**

The aim of Mike Oborn's two-part article on using the Microbee's high-resolution graphics is to provide an insight into the graphics commands of Microsoft BASIC – and to correct a few false impressions of the Bee's graphics capabilities.

reviews**29****Brother HR-15 Printer**

This little Brother letter-quality printer isn't a converted typewriter – and for its size it turned out to be very good value for money.

33**The Osborne/TEC Connection**

J J Sullivan attached his Osborne 1 to a TEC F-10 daisywheel printer, and although the marrying presented a few problems, the end result was a first-class combination for business use.

40**Juki 6100 Printer**

The Juki 6100 from Mitsui is a small, low-cost daisywheel which, according to Les Bell, gives excellent value for money.

42**Toshiba P1350 Printer**

Les Bell found this Toshiba printer to exemplify the current state of the art in high-quality dot matrix printers.

45**NEC Pinwriter**

The Pinwriter is NEC's first

serious attempt at a high-speed dot matrix printer, and Les Bell discovered it to be a force to be reckoned with in this marketplace.

48**Printer For The Microbee**

It's called by a variety of names, but this printer is the one chosen by Applied Technology to match the Microbee. Les Bell was very impressed with it.

52**Microbee/Olivetti Combination**

Don Kennedy attached his Microbee to an Olivetti Praxis 41 electronic typewriter, and ended up with this unusual letter-quality printing system.

55**A New Star ...**

The Star stx-80 thermal printer is a good example of a compact printer with good features for its size and price. John Nicholls reviewed it for us.

58**Mitsui 2100 Printer**

Another printer from Mitsui, the 2100 is a dot matrix with both draft and near-letter-quality modes. Les Bell had a look at it.

For beginners**99****Logic For Literati****Part V**

This month Les Bell tackles flip-flops and other circuits, and the problem of debouncing.

102**Understanding Assembler****Part XIV**

In yet another instalment of this thrilling series, Les Bell continues with the word counting program started in the last issue.

**NEC APC In Colour**

We borrowed a NEC Advanced Personal Computer plus colour printer and graphics tablet to help us create the graphics on this month's cover — the whole staff stopped work to play with this amazing system. Look out for a graphics special including the NEC package in a future issue.

117**Getting dBest From dBase****Part Four**

This month, Les Bell considers sorting and indexing files – the essential concept of the dBase system.

departments**113****Textfile**

Your letters to *Your Computer* – let us know what we're doing right (or wrong), ask other readers for help, air your pet whinge – just write to us.

124-144**Popular Systems**

Individual columns devoted to the more popular micros. This month's columns include TRS-80, CP/M, Microbee, VIC/C64, Apple, IBM-PC, Osborne, Kaypro and the TRS-80 Colour Computer.

142**Classified Ads**

Two pages of classified ads this month – anything you want to buy, sell or swap is here!



editorial

The announcement by IBM that it will assemble PC1s and XTs at its Wangaratta plant should be greeted with enthusiasm by the local PC user community. The response from local manufacturers, however, is likely to be less ecstatic. Many have been campaigning for government assistance for years, only to see the jolly blue giant receive valuable offsets which will give it a major advantage in tendering for government business.

However, the local assembly will not make much difference to the majority of users. Pricing will stay the same, delivery delays will not be improved, and it is obvious from the decision to start production next year and to supply the South-East Asian market that IBM still sees a long life in the PC and XT.

Perhaps more significant in the long term is the decision to establish a Software Development Support Centre in Sydney, which will award contracts to local software houses for the production of software both for IBM's internal consumption and for resale on world markets. This provides a significant incentive for locals to produce high-quality competitive software.

Equally significant is the decision to increase procurement of components and subassemblies from Australian industry, and to a lesser extent to produce software and documentation for the PC here.

These developments will inject something like \$150 million into the Australian economy over the next few years, and employ around 200 people. I hope there will also be a spin-off in the form of the creation of an infra-structure which will help the growth of the local computer industry. Local assembly and support for the PC, and possibly local production of subassemblies such as power supplies, together with local software production, can only hone the skills of Australians and provide a larger pool of skilled labour.

The IBM announcement represents a major step along the road to the position where Australian high technology reaches critical mass and we can start to compete in world markets. IBM Australia Managing Director Brian Finn is to be congratulated for taking the initiative in proposing to the IBM America Far-East board that Australia is worthy of not only consuming hi-tech products, but also producing them.

- Les Bell

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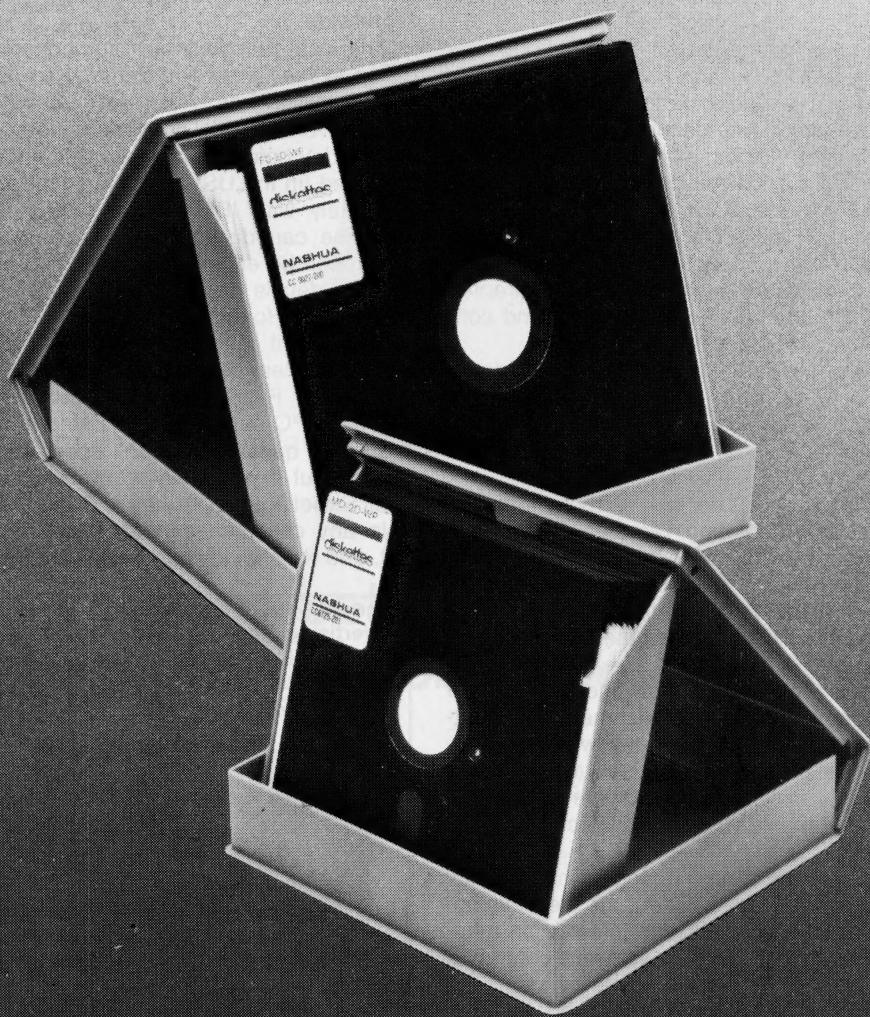
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YOUR COMPUTER is published monthly by the Federal Publishing Company Pty Ltd. Printed by ESN – The Litho Centre, Waterloo NSW 2017 (phone (02) 662-8888). **OFFICES:** **Editorial and NSW advertising:** 140 Joynont Ave, Waterloo NSW 2017. Phone: (02) 663-9999. Postal address: PO Box 21, Waterloo NSW 2017. Telex: FEDPUB AA74488. **Victorian advertising:** Mel Godfrey, 150 Lonsdale St, Melbourne 3000. Phone: (03) 662-1222. Telex: FEDPUB AA34543. **Queensland advertising:** Geoff Horne Agencies, 16 Bellbowrie Centre, Bellbowrie 4070. Phone: (07) 202-6813. **WA advertising:** Ian Greenacre, Gordon & Gotch Advertising, 134-144 Parry St, Perth 6000. Phone: (09) 328-8044. Telex: AA94436. **Sa advertising:** Admedia Group, 24 Kensington Rd, Rose Park 5067. Phone: (08) 332-8144. Telex: AA82182. **Publisher:** Michael Hannan. Typeset by Hughes Phototype, Spit Junction NSW. Phone: (02) 960-2788. Distributed nationally by Gordon & Gotch. Registered for posting as a publication – Publication No. NBP4384. See back page for information on copyright, contributions, reader services and subscriptions. **Source mail:** Les Bell TCY314; Matt Whelan TCY267. **MICC Bulletin Board:** (02) 662-1686 – Les Bell 1085, Matt Whelan 1, or leave a message in comments. *Recommended and maximum price only. ISSN 0725-3931.

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your computer news

IBM PC plant in Wangaratta

AUSTRALIA HAS scored quite a coup in the high tech world by becoming the third location in the world where IBM will assemble its Personal Computers.

Victorian Premier, John Cain, announced the IBM plan to assemble PC's at its Wangaratta plant, which currently produces typewriters for the Australian and SE Asian markets. The only other plant in the world outside the US is at Greenock, Scotland.

The Premier said that the Wangaratta plant would boost the high technology industry in Victoria and give an invaluable lift to the export drive. "Victorian skilled expertise in the technological area has gained widespread international recognition. This decision by IBM to choose Victoria as its second personal computer plant in the world outside the United States is further proof of the acknowledged skill of our workforce," Mr Cain said.

The Premier said that both the Victorian and Federal Governments had been involved in negotiations over offset arrangements with IBM. These arrangements would guarantee that a set proportion of the computer's components and software were built by Australian manufacturers.

IBM will begin phasing out its present electric typewriter production at Wangaratta in April, 1984. The company will begin production of the IBM PC that month and will ship the first units to Australian customers in July, 1984. Export to the Pacific and SE Asia is planned for 1985.

The IBM plan for local manufacture covers more than the PC, however. IBM Australia Managing Director, Brian Finn, outlined three other initiatives to expand local activities.

C software and documentation will also be produced locally, and a local group will expand procurement of components from Australia for not only the PC but across the whole product range.

Perhaps most important – particularly from the viewpoint of economics and employment – is the establishment of a Software Development Support Centre in Sydney which will acquire software from Australian software houses to fulfil three needs: software for internal use by IBM, software to be marketed internationally under the IBM logo, and local software to meet local requirements.

A contract for a product in the second category has already been let with Sydney software house Datec, for the development of enhancements to IMS, a mainframe information management system. The Centre is seeking a software contractor to develop another invoicing package for IBM internal use.

The new Centre is headed by Dr Frank Barr-David, a senior executive and IBM Australia Director. The Premier of NSW, Neville Wran, welcomed the announcement, and said that the IBM development package lent specific and timely support to initiatives for the local computer software industry announced by the State Government in recent weeks.

The moves by IBM are expected to generate around 200 jobs, although 50 of these will be filled by the existing Wangaratta staff, who faced a bleak future as world-wide purchases of typewriters declined. In financial terms, the package could be worth as much as \$150 million to the economy over the next five years.

Mr Finn told me that local production will not make an obvious difference to consumers of the PC. The price will not change, and current delays in shipments will not be directly eased. The problems are not caused by IBM production bottlenecks, but by a component shortage which would affect the PC wherever it was built.

I asked Mr Finn how far the company had progressed with

negotiations to purchase sub-assemblies, such as the power supply, locally. He replied that they had barely started looking at this aspect. "We've looked at the design of the PC, and our technical people estimate that we could eventually purchase around 25 per cent of the components locally," he said. "We are already buying some parts locally — for example, Pirelli Cables is manufacturing power cords which we export to IBM divisions worldwide."

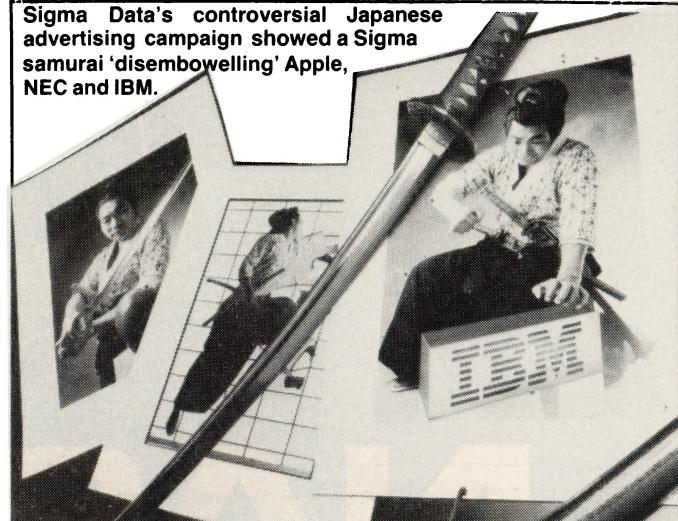
The local purchasing of components is of particular importance to the Offset Programme, as IBM estimates purchases of \$27 million from Australian computer component manufacturers over the initial five year period.

The day before the Wangaratta announcement, IBM had announced (in the US) a new machine which is designed to work intimately with IBM 370 and 303X series mainframes. The machine can display multiple windows to display processes which can be either local or running on the remote mainframe. Further details are on their way to us, and we hope to have them in time for this issue.

In the light of the current feverish speculation and rumours about the Peanut (most of it started by the press themselves), I asked Mr Finn whether he could comment. In reply, he told me what PC supremo Don Estridge had said on being asked the same question: "I don't speculate on other people's comments. But if you really want to know, why don't you call the Wall Street Journal — they're designing it, not me!"

In any case, an announcement is expected on November 1st, and we should have details by the next issue. □

Sigma Data's controversial Japanese advertising campaign showed a Sigma samurai 'disembowelling' Apple, NEC and IBM.



Lower Prices On Sigma/OKI Personal Computers

SIGMA DATA recently announced price reductions on its Sigma/OKI Model 20 and Model 30 personal computers. The former is now priced at \$4390 and the latter at \$5650 (both without tax).

The all-in-one design of the OKI means the printer, processor, two disk drives, keyboard and high-resolution colour screen are included in the price.

A free 'Star Software Sixpack' kit valued at about \$1000 is also included with the purchase of either computer. This kit consists of CP/M, BASIC, Wordstar, Calcstar, Mailmerge, and Spellstar programs.

For further information, contact Sigma Data on (02) 436 3777. □

Roland Quality at affordable prices.

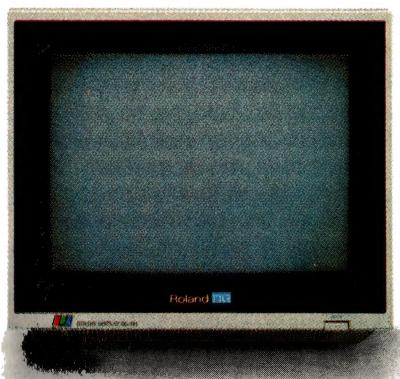
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Service As Usual For Osborne Users

DESPISE THE NEWS that the Osborne Computer Corporation in the United States is experiencing extreme financial difficulties, the approximately 5000 Osborne computer owners in Australia need not fear their investment will crash into a liability.

Although the Australian assets of Osborne Computer are to be sold to assist the parent company, back-up service for all Osborne hardware will be provided through Hills Industries, an independent service organisation, with a national network of centres employing over 400 technicians.

A major software distributor will also be appointed to provide ongoing support and handle inquiries from Osborne users. Said the company's managing director, Richard Graham, "There will be no shortage of software development because the Osborne operates with the standard CP/M operating system."

Following the company's announcement, in early September, that it would withdraw from the Australian market, Osborne experienced record sales of its computers. Graham attributed the upsurge to the fact that service had been assured and to the significant 'run-out' discounts then offered on Osborne machines.

He also expressed the company's desire to return to Australia when its circumstances had improved.

The Osborne parent company is currently trying to trade out of its difficulties, having been authorised by a federal bankruptcy court in Oakland, California, to raise temporary funding through an extended line of bank credits. This credit line, amounting to \$600,000, is sufficient to cover the company's expenses for about six weeks, and was raised by the Security Pacific Bank, the Chemical Bank of New York and the National Bank of North America.

According to documents filed by Osborne, its major creditors include Testology, a printed circuit board maker, which is owed \$US1.5 million; Siemens, of California, owed \$US1 million for electronic parts; and disk manufacturer Dysan, also owed \$US1 million.

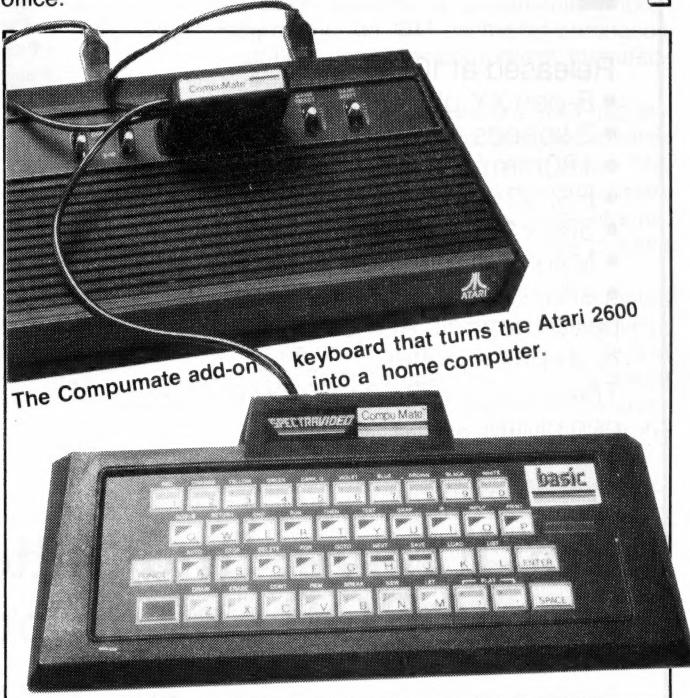
Osborne has retained about 60 of its employees in America to complete development of a new version of the Osborne portable computers. Adam Osborne, the company's founder, said this computer would run programs designed for the IBM-PC. □

graphics applications, all of which are said to be easily accessed and used.

All interfaces are claimed to be available in the CI-300's controller, including asynchronous and synchronous data communications protocols.

The CI-300 also offers great flexibility in easy selection of print speed and density, character and line spacing, line feed speed, print control and other functions.

For further information, contact Roger Stockford, Warburton Franki, on (02) 648 1711, or your nearest Warburton Franki office. □



Compu-Mate Plus Atari 2600 = PC

VIDEOACTIV ELECTRONICS has released the Spectravideo Compu-Mate, an add-on keyboard for the Atari 2600 games machine, which turns it into a personal computer.

The Compu-Mate sells for around \$120 at most department stores, and features: 16K ROM, 2K RAM, built-in BASIC, a 42-key sensor-touch keyboard, two-octave and two-channel sound capability and a built-in magic easel program, which allows you to draw pictures in up to ten colours. The keyboard can be plugged into any audio cassette recorder for storing programs.

Six software titles will also be available for the Compu-Mate in cassette format. They are: Type Mate, Song Mate, Word Mate, Maths Mate, Picture Mate, and Simon Mate, each of which will cost \$19.95.

For further details, contact Videoactiv Electronics, 70 St Kilda Road, St Kilda 3182. Phone (03) 537 2000. □

New User Group Listing

IT'S BEEN some time since *Your Computer* printed a comprehensive listing of computer user groups throughout Australia, and we're about to remedy that omission in our December issue.

If you're a member of a user group and would like to see it listed in the magazine, please write to us with details straightforwardly — our deadline for the December magazine is the first week of November. □



The C. Itoh CI-300 dot matrix printer, newly released in Australia.

C. Itoh Dot Matrix Printer

WARBURTON FRANKI recently announced the release of the C. Itoh CI-300 dot matrix printer in Australia.

The CI-300 brings high — 400 dot per inch — resolutions to bar codes, OCR, form generation, labels and word processing. It is also suitable for a wide range of business and scientific

THE DATABASE HOTLINE!

THE dBASE II EXPERTS



- ★ THE HOTTEST line in database management — Ashton-Tate's dBase II. The most popular DBMS on the world micro scene, it's one of the all-time record sellers. And for good reason.
- ★ dBASE II is a complex and extremely powerful system, yet even the novice can use it to control vast data structures.
- ★ A HANDFUL of straightforward English commands — like CREATE, EDIT, APPEND, or INSERT — is all you need to know to start using dBase II right now.
- ★ A POWERFUL English-like command language gives you almost unlimited control of your computer and its files. Full scale accounting systems have been written — by businessmen — using this language and dBase II's database management alone.
- ★ NEW: Version 2.4, just released, features several major enhancements.
- ★ WE SUPPORT dBase fully. We use it ourselves, for just about everything! If you want to know how to get something done with dBase, we're the people to talk to.

★ FRIDAY! — Son of dBase III!

- ★ The database management system from the masters, Ashton-Tate, for those who want real power without the need for programming.
- ★ HIGH POWER, low cost: around half price of dBase II.

Get it all done by Friday!

- ★ Friday is easy enough to use at home, powerful enough for the office.
- ★ Set up an "electronic file" without even peeking at the manual.
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- ★ Make handy mailing labels any way you want them.

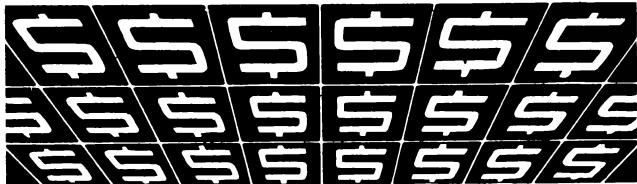
Friday is worth the price just for the way it handles mailing lists and labels!



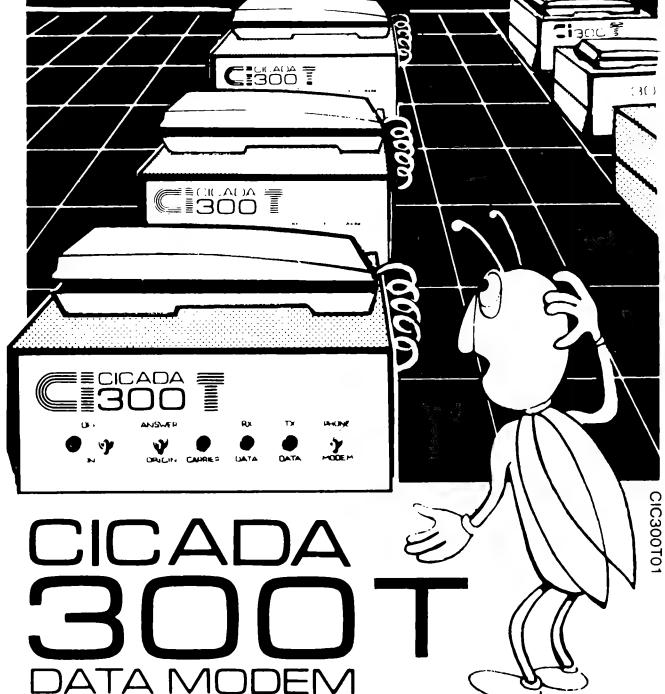
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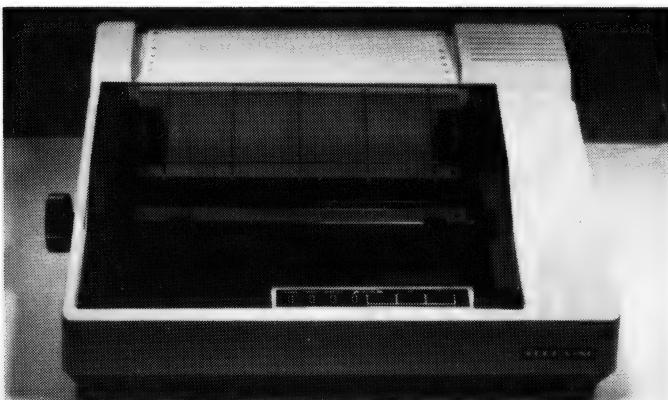
Or, buy the continuously improved standard Cicada 300 for use with your own telephone. Now operated by hundreds of government, business and private users, the Cicada series modems carry a full, meaningful warranty.

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The Alpha-80 printer from Intermec.

Interme's Alpha-80 Printer

THE ALPHA-80 printer is a compact unit designed to operate with a wide range of small computer systems, or to connect to a CRT terminal in remote printing applications. It can be used with most popular personal computers.

Standard features on the Alpha-80 printer are upper and lower-case characters in both normal and italic fonts, true descenders on lower-case characters, underline, block graphics, and full pin-addressable graphics. The nine-wire printhead operates bi-directionally, and is logical short line seeking.

Text printed on the Alpha-80 can be emphasised, double-strike, compressed or expanded. Superscripts and subscripts can also be printed. Character spacing can be either six or eight lines per inch, or programmable in increments as small as 1/126". Paper feed is both friction and by adjustable forms tractors.

For further information, contact Intermec Australia Pty Ltd, 9 Woodbine Court, Wantirna 3152. (03) 221 9788. □

Personal Electronics Lifestyle Expo

FROM DECEMBER 1 to 4, at Sydney's Centrepoin exhibition complex, the Personal Electronics Lifestyle Expo will display a vast range of electronic entertainment, education and communications products for the home.

Personal computers, the latest in home video technology and programs, creative music keyboards, video and computer games, home, car and walkabout sound systems, home robots and intelligent telephones will all be vying for your potential spending dollar. Don't miss it - *Your Computer* will be there! □

Word Processor Giveaway

DREAMCARDS, the Melbourne-based software distributor, is handing out free listings of its mini-word processor program for the Microbee with all sales of its software over the next two months. This special offer to YC readers is being made to celebrate Dreamcards' expansion from 'mail order only' sales to recent appointment of a number of dealers.

The new dealers (all of whom will have the word processor giveaway) are Jaycar/Electronic Agencies (all stores), Computer Technics (Sydney), Coastal Computers (Gorokan), Comput/ED (Coff's Harbour), Computerland South Melbourne (Melbourne), Magrath's (Melbourne), Computech (Belconnen), Microbee Computers (Canberra), Altronics (Perth), Pine Street Trading (Tom Price), Software 80 (Brisbane), Town & Country Computers (Townsville) and Quantum Computers (Hobart). □

Jaycar Overtakes

JAYCAR HAS taken over the operations of Electronic Agencies, including the firm's Microbee dealership. Electronic Agencies was the biggest Microbee dealer in Australia, and as a result of the takeover the number of Microbee retail outlets in Sydney has increased from two to four.

Sydney readers can now purchase all Microbee hardware, software and accessories from Jaycar shops at Hurstville (121 Forest Road), Carlingford (Cnr Carlingford and Pennant Hills Roads) and the former Electronic Agencies outlets in the city and Concord.

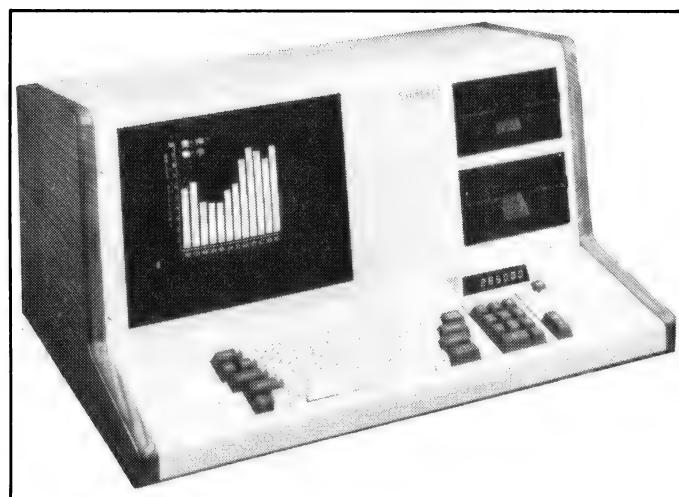
Speedy Micro-System

QT HAS RELEASED a micro-system which it claims offers throughput and performance twice that of a standard Z80A CP/M system. Called 'The Accelerated Business Computer', the system is said to use the Z80H processor at 8 MHz, while the standard Z80 system runs at 4 MHz.

The basic computer comes with a CP/M 2.2 operating system, two serial and two parallel ports and various application packages, relevant to individual user requirements.

A large range of peripherals and special purpose cards is available. A spokesman for QT said he expected the most popular configuration to include 256K of memory (upgradeable to two megabytes, a 20 megabyte Winchester disk (upgradeable to 140 megabytes). Adding an extra terminal and a software option will permit operation in a two-user, multi-tasking mode, at speeds far faster than standard single-user Z80A systems.

Further information may be obtained from QT, 140A Victoria Road, Gladesville 2111. □



Saga Systems' PBS-800 microcomputer.

Business Micro Speaks Eight Languages

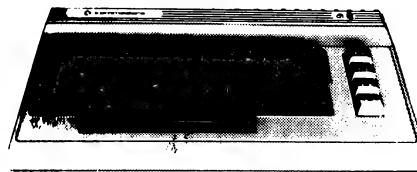
SAGA SYSTEMS Australia has been established to manufacture and distribute a range of microcomputers using the latest US and Japanese technology.

Its first offering is the PBS-800, a complete desktop system based on the high-speed Z80A microprocessor, with two 390K ▶

VIC 20



COMMODORE 64



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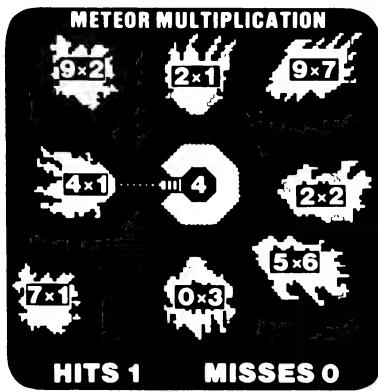
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Learning is easy when students are having fun. That's the idea behind DLM's Academic Skill Builders in Maths and Skill Builders in Language Arts.

Each of these twelve exciting and colourful educational software packages provides a highly motivational approach to learning. Unlike the other games on the market, these require that a child learn something useful while having fun. They also feature variable levels of difficulty, speed and running time. A child never outgrows DLM software!

DLM programs have been extensively field-tested. DLM's Language Arts games have all-Australian content. DLM is committed to quality. DLM programs have been highly praised time and time again in reviews in countless journals.

DLM Maths Skill Builders available for the:

- Apple II/IIe
- IBM PC
- Commodore 64 (disk)
- Atari 400/800 (disk).

DLM Language Arts Skill Builders available for the:

- Apple II/IIe.

From your local software shop, or contact the Australian distributors, Dataflow Computer Services Pty Ltd, on (02) 745 3303, at 6-8 Elizabeth St, Burwood NSW 2134, for a free colour brochure and the address of a software supplier near you.

floppy disks, and fitted with 64K of RAM (upgraded to 512K).

Standard features include: high-resolution 30 cm CRT for quality display and graphics, with 24 lines of 80 characters using P31 green phosphor, with anti-glare screen; integrated calculator with LED display and separate numeric keypad; business graphics; two RS-232 serial ports; two parallel Centronics ports; baud rates ranging from 62 bps to 65,000 bps; system diagnostics; CP/M operating system, word processing, financial planner and C-BASIC.

Various optional extras are also available, including hard disks and a modem.

A unique feature of the PBS 800 is its multi-lingual capabilities for users with the need to communicate and manage data in a variety of languages. Word processing and financial planning are currently available in seven human languages - English, French, Spanish, Italian, Arabic, Portuguese and Dutch.

Also available is the SAGA 85 intelligent terminal, incorporating many of the usually expected optional extras as standards.

Saga Systems has a complete range of printers available for word processing (20 cps to 55 cps), plus bi-directional dot matrix printers (80 cps to 350 cps) for graphics, listings and correspondence.

For more information contact Allan Hobbs on (047) 33-1539.



The MBC 555 — "Sanyo's answer to the IBM-PC".

Sanyo To Launch 16-Bit, IBM-Compatible Computer - Under \$2000

SANYO DATA SYSTEMS Pty Ltd will launch its answer to IBM's personal computer in December this year.

The MBC 555 is seen as a true personal computer, as distinct from the company's range of business computers, and will retail for under \$2000.

The MBC 555 features an 8088 16-bit processor and 128K memory, expandable up to 256K. The computer's 32K video RAM means the MBC 555 can also provide high-resolution graphics (640 by 200 dots) when using the optional high-resolution monitor. Dual disk drives give disk storage of 320K, and an additional 320K option will be available early in 1984.

Contact Mark Johnston, Managing Director, Sanyo Data Systems, on (02) 929 4644 for more information.



More On The Magnum

IN OUR REVIEW of the Australian-designed and manufactured Magnum portable computer in the October issue of *Your Computer*, we neglected to mention a few valuable members of the team of designers and developers working at Dulmont.

The basic concept of this high-powered portable computer was developed by David Irwin, and he, A.C. Westbury (Dulmont's General Manager) and Barry Wilkinson all carried the project through to the start of its full-scale development, after which the remainder of the design and development team was put together. All major conceptual changes also came from this initial team.

Our apologies to the team at Dulmont for these inaccuracies in our article. □

Judge Rules - Computer Systems Are 'Goods'

A JUDGMENT OF major importance to buyers and sellers of computer systems was made in the Supreme Court last month.

The Honourable Mr Justice Rogers ruled that sales of computer systems, comprising both hardware and software, constitute 'sales of goods' within the New South Wales Sales of Goods Act (1923), and the Commonwealth Trade Practices Act (1974).

The judgment affects dissatisfied users faced with suppliers who disclaim responsibility for a system's deficiencies, and should cause suppliers to reconsider whether their products are of merchandisable quality.

The judgment was made in part of an action brought by Toby

Constructions Pty Ltd against Computer Bar Sales Pty Ltd.

The plaintiff had purchased a computer system - which included an Executive Five accounting package, stock control, payroll and word processing software - at a total cost of \$14,390, from the Ward Computer Company Pty Ltd.

The plaintiff claimed the computer was deficient and brought action against three defendants, in respect of losses alleged to have been suffered as a result of this deficiency.

In his judgment dealing (solely) with part of the Amended Statement of Claim, Mr Justice Rogers said, "I come to the conclusion that a sale of a computer system, comprising both hardware and software ... does constitute a sale of goods, within the meaning of both the Commonwealth Act and the State legislation. There is a sale of tangible chattels, a transfer of identifiable property ..." Mr Justice Rogers went on to note that, "It may be a debatable question whether or not the sale of computer software, by itself, is sufficient to constitute a sale of goods within the meaning of the legislation I am considering. However, I have no doubt that the sale of a system in toto is within the legislation ..." Commenting on whether software alone constituted 'goods', Mr Justice Rogers said, "I do not wish 'to be thought that I am of the view that software itself may not be 'goods' ... Questions arising here are of importance to the computer industry, and I think it is appropriate that those who attend to matters of law reform should consider whether or not legislative action is required to ensure the matter is put beyond argument." □

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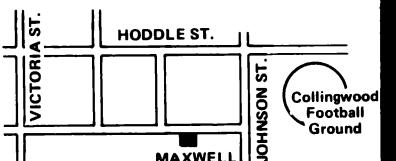
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YOUR COMPUTER NEWS • YOUR COMPUTER

New Software Publisher

SOURCEWARE Pty Ltd began operations this year as a distributor of software, hardware additions and support products for the IBM-PC and IBM mainframe markets in Australia and New Zealand.

In addition to products for IBM computers, Sourceware plans to publish new Australian software, mainly in the business area, and where possible to market it overseas as well as in this country.

Look out for an article in the December issue of *Your Computer* on getting your software published – through Sourceware and other methods. □

Commodore Cuts Prices

COMMODORE HAS lowered the price of the Commodore 64 and its accessories, with effect from September 1 this year.

Up to \$200 will be cut off the price of the 64, disk drives and printers; data cassette recorders are reduced by \$50, and the price of popular games cartridges will be lower by up to 25 per cent.

According to Commodore, these price cuts mean the Commodore 64 with disk drive and printer is now the first 64K personal computing system in Australia costing less than \$1500.

For more information on all these products, contact Nigel Shepherd on (02) 427 4888. □

New Goodies For The VIC

COMPUTER CLASSICS has released several new software packages and games for the VIC-20, including 'VIC Education', a learning centre.

VIC Education tapes teach basic skills in mathematics and language, with varying levels to suit children of all ages. A total of 19 cassettes makes up the series, sold either individually or as 'six-packs' aimed at, for example, various aspects of maths or English.

VIC Education tapes were developed in Australia for Australian schoolchildren and curricula.

Whether you're a beginner or an expert, you can improve your chess skills using 'Sargon II Chess' on the VIC-20. You can choose the level of play, and 'Sargon II Chess' is claimed to play a superior game at a faster speed than many other computer chess games.

The current movie hit 'War Games' now has a computer game counterpart on the VIC. It is based on the story of the film, where a teenage computer whiz-kid accidentally hooks into the NORAD (North American Air Defence Command) computer system and almost starts World War III.

Players of the computer game are presented with the same challenge: race against time and overcome various obstacles to reach NORAD's computer and save the world from disaster.

The game comes in cassette form, and is played through the VIC's keyboard using ordinary language commands, in much the same way as the original 'Adventure' game was played. 'War Games', however, makes full use of the VIC's graphics ability as well as using text. The recommended retail price is \$19.95.

For more information on all these Computer Classics releases, contact Roger Davis on (02) 439 5338. □

Adam Arrives – Well, Nearly

The CBS-Colecovision games centre, which has been available in Australia since August, will soon have an add-on component which turns it into a fully-fledged home computer with 80K of on-board RAM, a full typewriter keyboard, a built-in daisywheel printer and built-in word processing capabilities. ►

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Tallgrass Technologies is the industry leader in Winchester HardFile™ and streaming tape subsystems for the IBM® PC and related computers. Major corporations, banks, governmental agencies and small businesses throughout the world depend on Tallgrass HardFile subsystems for their mass storage and backup requirements.

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WHAT ABOUT DATA INTEGRITY?

Tallgrass offers backup on ANSI standard 1/4" tape cartridges, instead of the usual floppies, video cassettes, or low-capacity removable Winchester devices. The Tallgrass 12.5Mb formatted HardFile can back itself up on an economical data cartridge in less than 10 minutes.

All Tallgrass HardFiles are equipped with a dedicated landing Zone where the read/write heads

land. This protects against incidental damage and data loss during power-downs and transportation.

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(02) 7122010/7122003



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Together, the Colecovision and the add-on component provide the same capacity as the 'Adam' computer, scheduled to be released in the USA in November this year and in this country next April. People who have already bought the games centre in Australia are expected to be able to obtain the add-on computer component from November this year.

The games centre retails in Australia for around \$249, and the add-on unit is expected to sell here for around \$990, bringing the cost of the complete computer to about \$1200. When you consider that the cheapest daisywheel printer available in this country is itself around \$900, this new computer sounds very attractive.

Word processing is built into the machine on a chip, in line with CBS's intention of keeping operation of the Adam as simple as possible. For storage of information the computer uses 'Datapacks', claimed to be much faster than cassettes but cheaper than disks.

Both the add-on unit and the Adam computer will be sold through ordinary department stores rather than specialist computer shops, with the aim of keeping the price down by avoiding the need for computer experts to sell and service the machine.

CBS has already made a considerable investment in the development of educational software for the Adam. It has reached agreement with the Smithsonian Institute and National Geographic for the use of archival material in computer programs, and has also teamed up with the Children's Theatre Workshop, the makers of 'Sesame Street', to develop further educational material.

According to Mr Norman Stollman, Senior Vice-President of CBS America, who was in Sydney recently for a press conference, CBS is also interested in the possibility of developing or adapting educational software for use in Australian schools, rather than simply marketing the American product without taking into account the differences between American and Australian cultures.

For more information on CBS-Colecovision and the add-on computer component, contact William Love & Co, Suite 6, Level 3, Building 6, Birkenhead Point 2047. (02) 819-7455. □

The Hard And The Soft Of It From Ozi

OZI SOFT HAS released two new hardware add-ons and a large range of new Atari, VIC-20 and Commodore 64 software products from England and the United States.

The hardware consists of a joystick, called the 'Triga Command', which features a full handle grip and an index finger trigger for fast reactions to alien attacks, plus a product called the Koala Pad.

The Koala Pad is a graphics tablet, designed for the Commodore 64, VIC-20, Apple, IBM and Atari computers, which allows the user to draw high-res pictures directly onto a television screen. With commands like copy, mirror, colour fill, box, circle, disc, storage and zoom, one can create and store images.

Available at major computer outlets, the Koala Pad has a recommended retail price of \$149.95, and will be reviewed in a future issue of *Your Computer*. For further information, contact Ozi Soft on (02) 29 6330. □

National Skills Register

COMPUTERISED DATABASES have long been associated with spreading the word, and a Brisbane-based group of professional business people has announced a new information service.

Known as the Australian National Skills Register (ANSR), this unusual series of databases is attempting to aid in the search for skills and products within the computer industry. ANSR, in association with the Productivity Promotion Council of Australia, is readily available to subscribers through the national network of ICL bureaux.

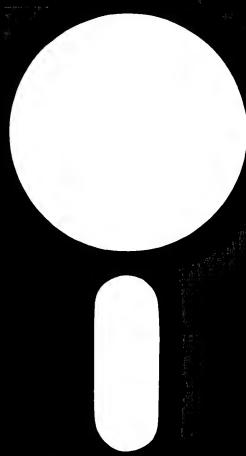
A typical Skills Register data entry form would include a subscriber's personal details, qualifications and experience, and the Hardware and Software Registers would contain company product information.

By using a parallel database system mounted on STATUS, an Operations Manager is able to log on to ANSR via a modem or acoustic coupler linked to a screen or teletype terminal, key in his/her requirements with regard to skill and price, then select the person or contractor most suited to his/her needs. Without logging off, he or she can then change to the Hardware and Software register to scan product information and availability.

An annual fee of \$20 is payable for entry onto the Skills Register, plus an application fee of \$10. Corporate membership is also \$20 per person plus an application fee of \$50. Entry to the Software or Hardware Registers costs \$100 per annum per product. Files are updated free of charge whenever necessary. However, if an entry is updated more than five times in a single year, a small handling charge may apply.

Further information may be obtained from Ken Gardiner, Australian National Skills Register, GPO Box 1819, Brisbane 4001, (07) 343 2924, (07) 282 5585, or from Ian Morris, Productivity Council of Australia, Queensland Branch, PO Box 689, Brisbane 4001, (07) 221 6132. □

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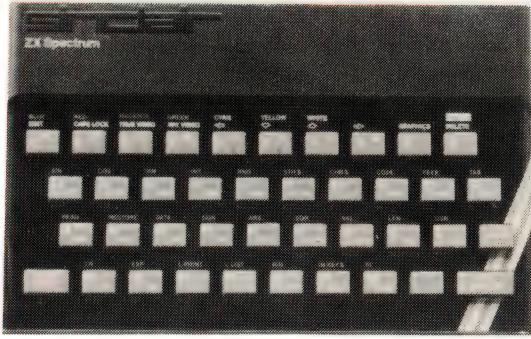
Requires 64K Microbee™ for operation. Full operating CPM system should be available mid-November.

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Microbee is a registered trademark of Applied Technology Pty. Ltd.

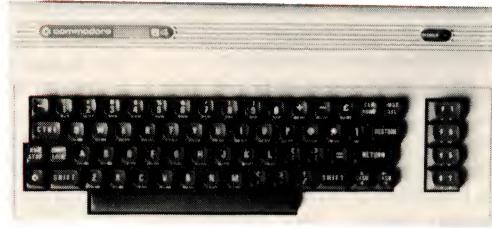
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PRINTER FEATURE

All You Ever Wanted To Know About Printers...

If you think of a normal computer system, one component that inevitably comes to mind is a printer. While a micro user can survive without one, the range of activities you can use your computer for is dramatically increased by the acquisition of a printer.

THERE ARE two main ways a computer can talk to the real world – through a screen or through a printer. The important difference between the two is that a printer produces 'hard copy' - a permanent record after the printer is switched off, not overwritten by subsequent information as on a screen.

Printers have many applications. The usefulness of a word processor is limited unless what it produces can be put on paper for distribution to those who do not have a machine or who prefer to receive data on paper. You can keep dumps of source listings on paper while your compiled versions are kept on electronic media; you can even publish a

newspaper. The list goes on.

A large range of printers is available for microcomputers now that manufacturers have recognised the potential of the micro market, and it is now possible to buy a reasonable printer for as little as \$350. Micro owners will naturally be interested in getting the cheapest printer available that can still fulfil their requirements, which usually restricts them to a choice of three kinds of printers – dot matrix, letter-quality daisywheels, and thermal printers.

Thermal and dot matrix printers are usually the cheapest, and for many users will offer perfectly adequate service, but if your work needs to be of presentation standard you will probably have to move a little up-market and go for a daisywheel. This article describes in depth the kinds of printers available for all types of computers, and discusses the problems of choosing which is right for you, and of interfacing the printer to your computer.

Types Of Printers

Printers are usually categorised by the way the character set is contained

within the printer, or by the way the character is transferred onto the paper.

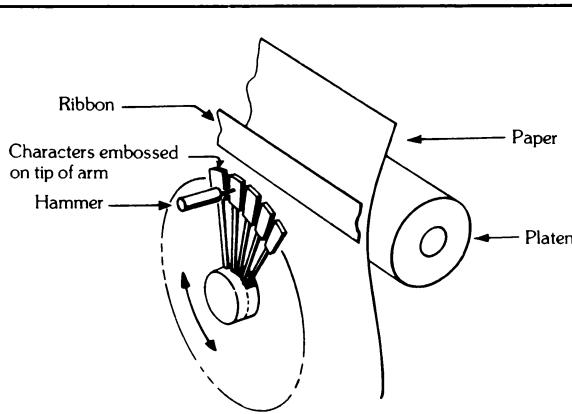
The main categories of printers are as follows:

(1) Letter-Quality Printers

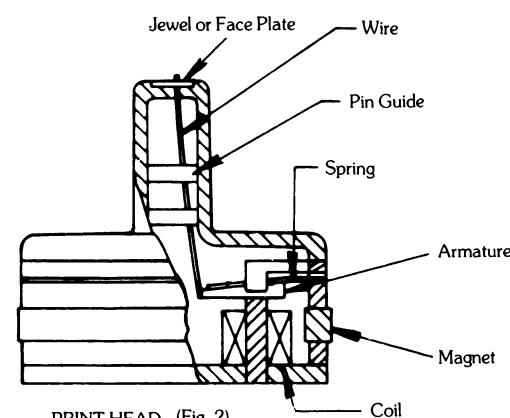
A low-speed printer, typically 35 to 55 characters per second (cps) – although cheaper models can be as slow as 11 cps – which produces electric typewriter-quality print. The characters reside on the fingers of a plastic or metal wheel, called a daisywheel or thimble, which revolves past a single hammer.

As the characters to be printed pass, the hammer is activated, causing the character to impact the paper through a carbon or nylon ribbon (Figure 1).

This type of printer is used to provide high-quality output from the computer system, usually for word processing applications. Daisywheel printers have accessories such as tractor feed for continuous stationery, single and dual-bin sheetfeeders for continuous feeding of single-sheet stationery, and envelope and front feeders for manual insertion of stationery.



DAISY WHEEL PRINTER (Fig. 1)



PRINT HEAD (Fig. 2)

(2) Matrix Printers

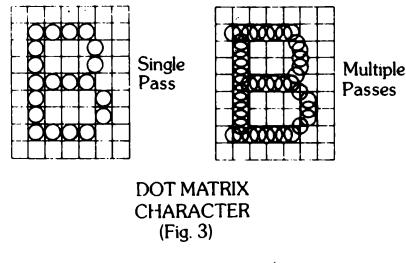
Also referred to as *impact* or *dot* matrix printers, these devices have been available since the early seventies, when the first Centronics 100 series came off the production line. In this type of printer the characters are constructed by the 'head' as the printing takes place.

The head of the printer contains a number of wires in a vertical line which extend through the 'jewel' or face plate of the head (Figure 2).

The characters to be printed are electronically stored in the printer and transmitted to the head in sequence. As the head moves across the page, the wires in the head are activated or 'fired' systematically to produce the character image. This is done by the wires striking the paper through a carbon ribbon.

Some of today's matrix printers can produce print quality which is close to the quality obtained from daisywheel printers. This is achieved by one of two methods, the first being the multipass method, where the printhead passes over the same line several times to build up a solid-looking character. This method has a negative effect on throughput as the same line is printed several times (Figure 3).

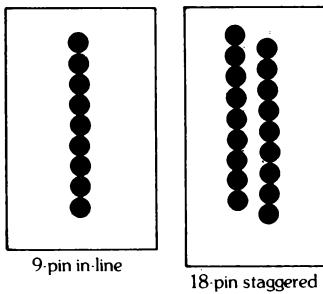
The second method utilises a high-



pin-count head, which can have up to 24 wires. Narrower than in nine-wire heads, these wires are arranged in a staggered pattern to achieve a greater dot density (Figure 4). This enables a high-quality character to be printed at higher speeds.

Characters printed by either of these methods would have densities of approximately 18 by 25 as opposed to normal matrix print of 9 by 9 or 9 by 7 density.

Matrix printers have print speeds



ranging from around 40 characters per second (cps) up to about 340 cps.

(3) Line Printers

There are several types of printers grouped under this heading, and even though their technologies differ they still present the same image to the user; that is, the appearance of printing a line of print at a time, with high throughput measured in lines per minute (lpm) rather than characters per second (cps). The types of printers which are classed as line printers are drum, band, chain, train, and belt.

(3a) Drum Printers

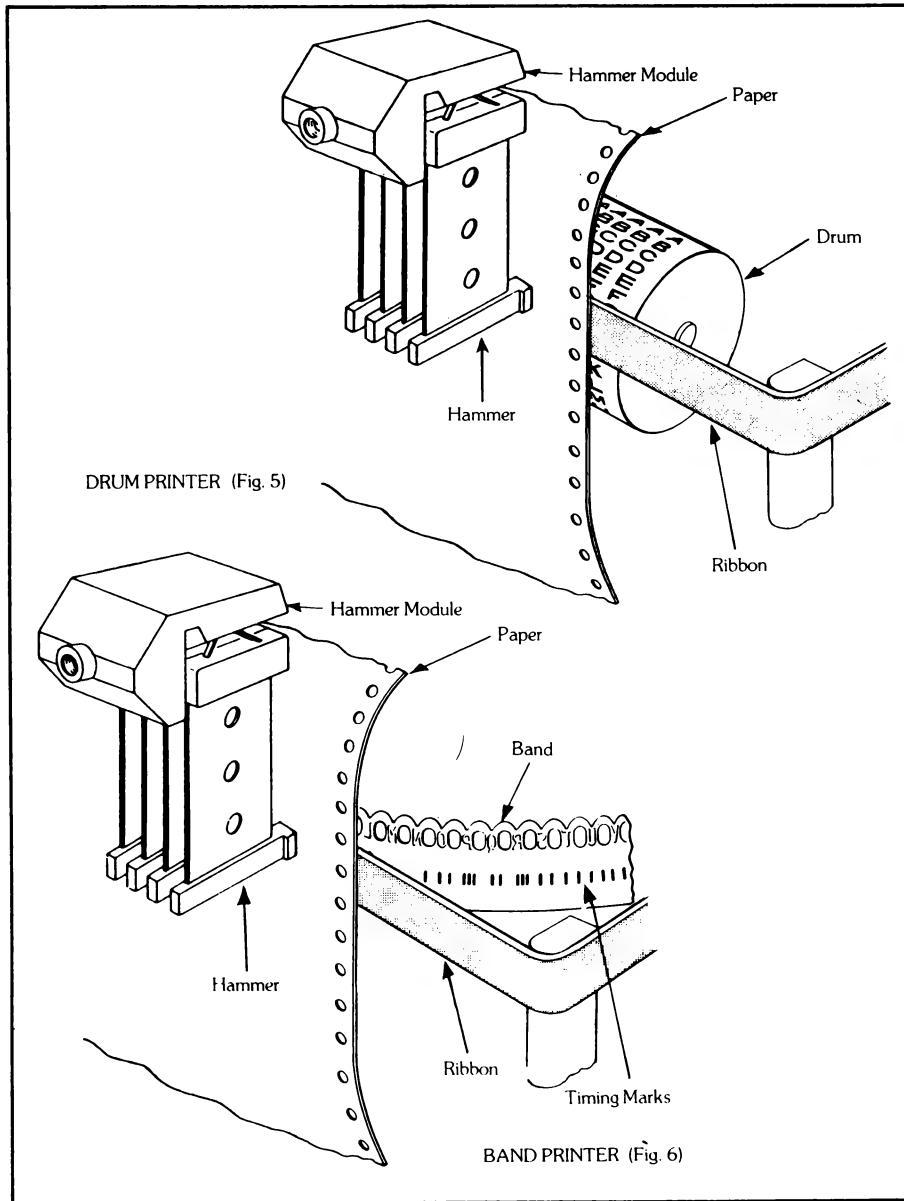
These printers derive their name from the drum on which the character set resides. The drum revolves past a fixed hammer bank which usually contains 132 hammers. As the characters to be printed pass the hammer bank the

appropriate hammer strikes, hitting the ribbon and paper against the character. In this method it takes one revolution of the drum to print an entire line (Figure 5).

(3b) Band Printers

Band printers are the latest technology in high-speed impact printers, with the majority of manufacturers now using this technique. Band printers are a form of line printer where the characters exist on a very light steel band which rotates past a bank of 132 hammers. In a similar manner to the drum printer, the hammers are activated as the character to be printed passes the appropriate hammer. In this case, however, as there is more than one complete character set on a band (usually three), a line of print can be printed before the band has rotated once (Figure 6).

The advantages offered by band print-



ers over other types of line printers are:

(i) Less moving mass within the printer, hence less ongoing maintenance and high MTBF (mean time between failure) figures.

(ii) Greater flexibility of character sets and font styles, with the ability to easily change bands.

(4) Laser Printers

Laser printers are at present the ultimate in printing technology, reaching speeds of up to 10,000 pages per hour. Needless to say, they're very expensive and would only be cost-justifiable for large corporations with huge amounts of throughput.

In laser printers, the original text is 'taken' electronically and converted into a myriad of little 'dots' - about ten million per page. A laser turns each 'dot' into a burst of energy, which is then imprinted, again as a 'dot' but this time in the form of an electrical charge, onto a photo-sensitive rotating drum. An electrically charged toning material is then spread across the drum, and this forms the required image by adhering only to the previously formed 'dots'.

This image is then transferred to the printing paper, which passes through driers before leaving the machine. (In present practice the dot image 'prints' the background - the areas left untouched thus form the characters.)

(5) Thermal Printers

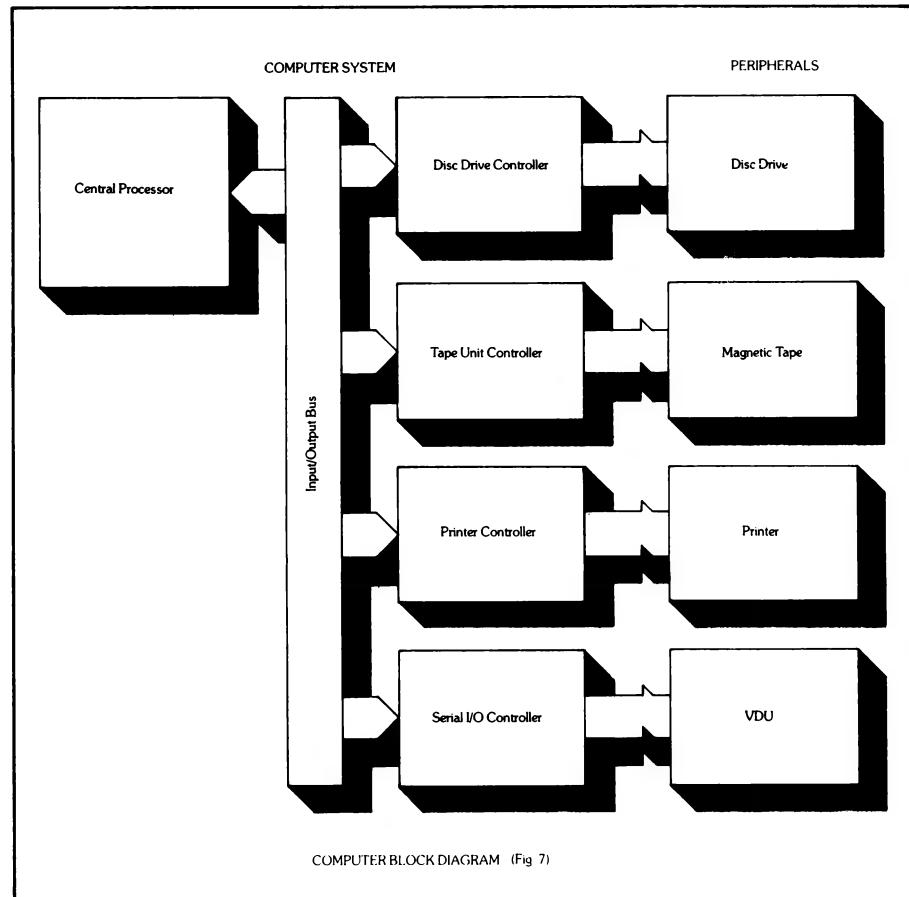
Thermal printers are similar to dot matrix printers except that the pins are heated and the paper is heat-sensitive. The advantage of this is that the print-head does not have to impact on the paper with very much force, which makes operation much quieter. The disadvantages of thermal printers are that they run only about as fast as a letter-quality printer, and require special heat-sensitive paper.

How A Printer Works

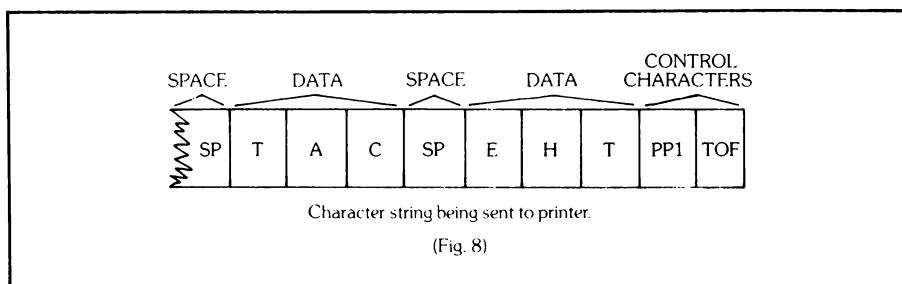
To discuss how a printer achieves its function of producing printed matter, the topic has to be broken into two parts: first, how the printer communicates electronically with the computer system to receive the data to be printed, and second, how the printer converts the electronically encoded data into mechanical motion in order to print the correct sequence of characters.

Interfacing

In order for printers to receive information to be printed they have to be interfaced into the computer system. That is, they have to be connected to the computer system in such a way that both units can successfully communicate and understand what the other is



COMPUTER BLOCK DIAGRAM (Fig. 7)



doing. For example, there is little point in the computer trying to send data to the printer if the printer is already busy printing other data or is not even turned on.

Successful interfacing is usually achieved by using one of the interface standards such as RS232C serial, Dataproducts parallel or Centronics parallel. These standards define the wiring connections, signals and procedures to be followed by each unit to enable successful communication.

Briefly, in serial transfer of data, information is transferred down a single line one bit at a time. In parallel transfer, one data word or 'byte' (eight bits) can be transferred in one hit, often down ribbon cable.

Computer systems have a transfer 'bus', called in general terms an input/output (I/O) bus, used to transfer information between the computer system

and its peripherals (for example disk drives, magnetic tape drives, screens, printers). As each peripheral handles data in different ways and at different speeds, the standard transfer mechanism used on the I/O bus has to be converted to the special needs of the peripheral, so there is a controller such as a printer controller to handle the printer. (See Figure 7.)

The printer controller accepts data being sent to the printer, checks to ensure the printer is able to receive data and then sends the data to the printer. When the printer has completed printing data it informs the printer controller, which in the meantime has received more data from the computer to be printed. This is then sent to the printer. This sequence continues until all the data to be printed has been transferred to the printer.

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EXPANDABLE TO	256K**	256K**	64K	NO	N/A	32K	64K	48K
KEYBOARD FEATURES								
NUMBER OF KEYS	87	71	63	61	66	73	53	40
USER DEFINE FUNCTIONS	10	NO	N/A	4	8	10	N/A	N/A
SPECIAL WORD PROCESSING	YES	YES	NO	NO	NO	NO	NO	NO
GENERATED GRAPHICS (FROM KEYBOARD)	YES	YES	NO	YES	YES	YES	YES	YES
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RESOLUTION (PIXELS)	256x192	256x192	280x160	320x192	320x200	256x640	256x192	256x192
SPRITES	32	32	N/A	4	8	?	16	?
SOUND CHANNELS	3	3	1	4	3	1	3	?
OCTAVES PER CHANNEL	8	8	4	4	9	3	5	3
A.D.S.R. ENVELOPE	YES	YES	NO	NO	YES	YES	NO	NO
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CASSETTE	2 CHANNEL	2 CHANNEL	1 CHANNEL	2 CHANNEL	1 CHANNEL	2 CHANNEL	?	?
AUDIO I/O	YES	YES	NO	YES	NO	?	?	?
BUILT IN MIC	YES	YES	NO	NO	NO	NO	NO	NO
DISK DRIVE CAPACITY (LOW PROFILE)	256K	256K	143K	92K	170K	100K	?	?
CP/M® COMPATIBILITY (Standard 80 column programs)	YES	YES	NO****	NO	NO****	YES	NO	NO
CP/M® 22	YES	YES	NO	NO	NO	NO	NO	NO
CP/M® I*	YES	YES	NO	NO	NO	NO	NO	NO

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* 64K user addressable plus 16K graphic support

** 240K user addressable plus 16K graphic support

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turers designed systems in such a way that only that company's printers would connect with their system. Now with the advent of plug compatibility, printers can connect to most computer systems on the market today.

The Printer

The data received by the printer from the printer controller is of two types:

(i) Control characters – which give instructions to the printer such as the location of data on the page, page length, and so on.

(ii) Data characters – that is the text to be printed.

With reference to the basic block diagram of a band printer and the string of characters in Figure 8, the manner in which a printer converts the characters received into mechanical motion to actually print as shown in Figure 8.

The first two characters being sent to the printer are control characters. TOF is a signal to the printer to move the paper to the top of the next form (page). PP1 tells the printer that the data to be printed will commence in print position one, which is the first column of the first line. The remaining characters in this string are data characters, which will be received by the printer in sequence and printed onto the paper in the same sequence.

A. When the printer is ready to accept data, the character string will be transferred to the interface of the printer from the printer controller.

B. The interface is programmed to recognise all control characters and send them to the processor.

C. The printer processor interprets the control characters, and on reception of TOF it sends a signal to the paper motion block to move the paper to the top of the next form.

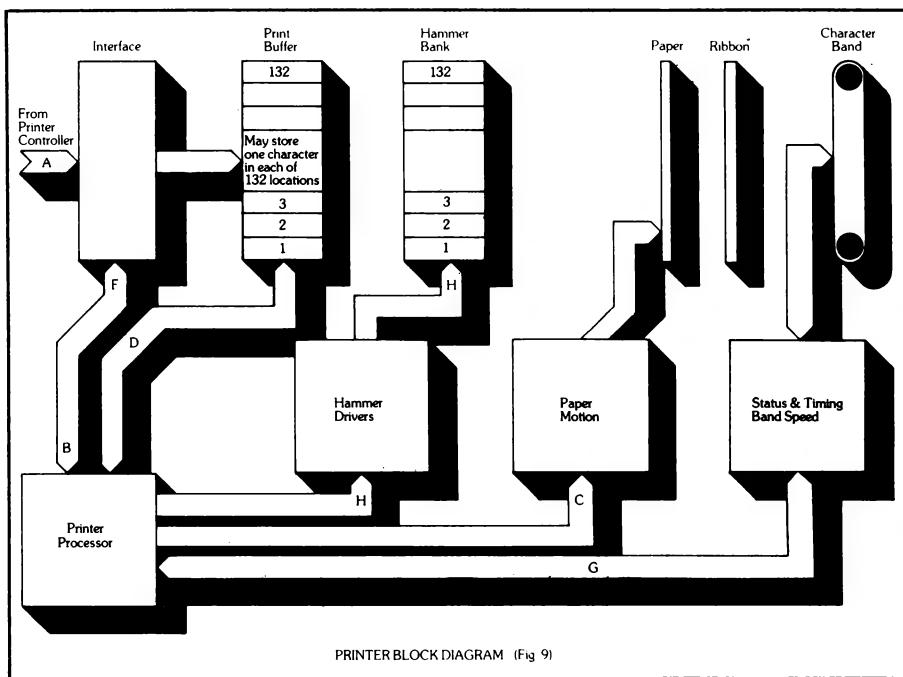
D. The PP1 character tells the processor that the characters to be printed should be loaded into the print buffer to commence in buffer location 1, which corresponds to column 1 on the paper.

E. Therefore the following data characters being received by the interface are loaded into the print buffer. The loading of data into the print buffer continues until either the 132 locations are filled or a carriage return is received.

F. At this point a signal is sent from the processor via the interface to the printer controller to cease sending data until the line is printed.

G. When the print buffer is filled, the processor performs a comparison between the contents of the print buffer and the character positions on the moving band.

H. When a comparison between a



PRINTER BLOCK DIAGRAM (Fig 9)

TYPE OF SYSTEM	DAISYWHEEL	MATRIX 80cps-200cps	MATRIX 200cps-400cps	LINE PRINTER 300 lpm-600 lpm	LINE PRINTER 1000 lpm-2000 lpm	MATRIX Near Letter Quality
Personal Computers	6	10	6	0	0	7
Micro Computer	7	8	8	5	0	8
Business System	7	6	8	9	6	8
Mini Computer	0	0	0	3	10	0
Mainframe	7	9	9	5	0	8
Network Environment	10	0	0	0	0	8
Wordprocessing						

(Applicability of Printer Type to Computer System. Rated out of 10). (Fig 10)

character position on the band and the print buffer is detected, the processor sends a signal to the hammer drivers to activate the hammer at the position in question. In this way, as the band rotates, the printed line will be built up on the paper.

For example, with our data in Figure 8, when a 'T' rotates past print position 1 the processor would activate hammer 1. When an 'H' corresponds with print position 2 the second hammer would be activated. Eventually the message THE CAT ... would be printed on the first line of the page, starting in column one.

How To Choose The Right Printer

The selection of the right printer should take into consideration two aspects:

- (i) To what type of system is the printer to connect?
- (ii) For what application is the printer required?

The first point allows broad classification of the range of printers from which the choice will be made. This classification basically comes about because of the 'typical' usage associated with the various 'sizes' of computer systems. For

example, Figure 10 sets out the types of printers usually found on computer systems.

The degree of frequency of a type of printer's attachment and/or applicability to the computer system is given as a rating out of ten.

This table identifies the type of printer and the speed range which are usually associated with particular sizes of computer systems.

The following list of questions, when answered in conjunction with your known printer requirements, will highlight the important features which should be considered when making a purchasing decision.

1. What quality print do you require – solid font, draft quality, letter quality?
2. What speed do you require to handle the level of printing to be done in the time required? (An exercise in throughput should be carried out.)
3. Do you need to change the line spacing of the print, for example, from 6 lpi to 8 lpi; if so, what spacings?
4. Do you need different pitches, for example 10 cpi, 12 cpi; if so, what are required?

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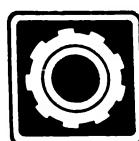
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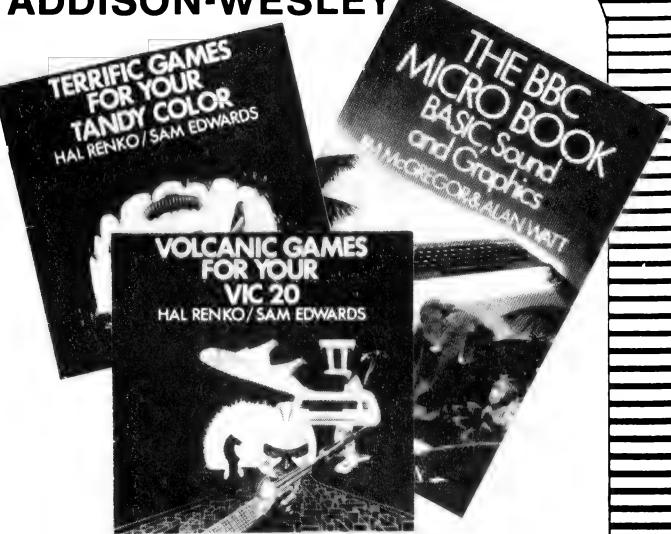
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5. Do you require expanded print for headings?

6. Do you require condensed print?

7. If yes was answered to any of questions 3 through 7, is your software able to handle those features or do they have to be switch-selectable by the operator?

8. What number of print columns do you require?

9. What sort of character set do you require – standard upper and lower case or something special?

10. Does the stationery to be used have any special characteristics?

11. Do you need to be able to print multiple copies? How many?

12. Do you require graphics capability, block graphics or pin addressable? If so, can your software handle graphics?

13. Do you require colour printing. If so, can your software handle colour printing?

14. Is the noise level of the printer important given the working environment?

Connecting Your Printer

1. Do you require special controllers or interfacing?

2. Can these only be provided by the original system supplier or can a plug-compatible printer vendor help?

3. If you are connecting serially:

(i) Will the baud rate of the serial port degrade the speed of the printer? Remember as a rough rule of thumb, 10 baud equals 1 cps.

(ii) If the printer is to be connected remotely, will the communications line degrade the print speed? – same rule applies.

(iii) What type of communications protocol will your system handle?

4. Does your system have a parallel communications port?

5. Is it Centronics, Dataproducts parallel or do you require a special controller?

Paper Handling

1. If you are printing on continuous stationery, will you require tractor feed?

2. Given the physical location of the printer, will you require bottom feed, rear feed or front feed?

3. Will you be printing on single (cut) sheet stationery?

4. Will the throughput be significant enough to require a cut sheet feeder?

5. Will the printing be on letterhead and follower, hence requiring dual-bin cut-sheet feeder?

Format Control

1. Will you require:

(i) Form length select switch?

(ii) Paper tape controlled forms length select?

(iii) Electronic forms length control?

2. Will your software handle tape and/



or electronic (direct access) format control?

Glossary Of Terms

This glossary has been included to assist the uninitiated in understanding some of the jargon which surrounds printer systems.

ASCII. American Standard Code for Information Interchange – gives the characters, and their codes, most commonly used to send data to printers.

BAUD. Number of bits per second transferred via a serial communications line, for example 1200 baud equals 1200 bits per second.

BLOCK GRAPHICS. Graphics built up from standard symbols in the printer.

BUFFER. Temporary data storage area.

CENTRONICS PARALLEL. A standard of interfacing which transmits all the bits of a character (byte) at the same time.

CONDENSED PRINT. Reduced print from a matrix printer, usually at 16.5 cpi.

CONTROL CODE. A non-printed character used to initiate, stop or modify printer action.

CONTROLLER. A device which controls the flow of data over an interface.

CPI. Characters per inch.

CPS. Characters per second.

CUT SHEET FEEDER. Device for automatically feeding single-sheet stationery.

DAVFU. Direct Access Vertical Format Unit – used to downline load forms length from system.

DOT GRAPHICS. Graphics built up by addressing each wire or pin in the head.

DOWNTIME LOAD. The loading of format data by the system into the printer over the interface lines.

DPC PARALLEL. A standard of interfacing which transmits all the bits of a character (byte) at the same time.

ESCAPE CODE/SEQUENCE. A character or sequence of characters used to inform the printer that the succeeding group of characters is to be interpreted differently, for example as control functions.

EXPANDED PRINT. Enlarged print from a matrix printer, usually at 5 cpi.

FLS SWITCH. Forms Length Select Switch

FONT STYLE. The shape of the printed characters, for example Courier, Elite, Prestige.

FRICITION FEED. Paper is held in position by the platen.

HAMMER. Device used to strike the characters to impress their image onto the paper.

INTERFACE. A connecting device which makes two units compatible for communication purposes.

KSR. Keyboard send/receive device, i.e. printer with a keyboard.

LPI. Lines per inch.

LPM. Lines per minute.

MATRIX DENSITY. Number of dots which make up a matrix character.

MODEM. MOdulator DEModulator – converts data to and from digital form and a form acceptable for transmission over a communications line.

MOSAIC GRAPHICS. See block graphics.

MTBF. Mean Time Between Failure.

MTTR. Mean Time To Repair a failure.

PARALLEL TRANSMISSION. Data transmission whereby all eight bits of one byte are transmitted at the same time. (See Centronics Parallel and DPC Parallel.)

PIN ADDRESSABLE. See dot graphics.

PIN FEED. Pins on platen to guide continuous stationery.

PITCH. Number of characters per inch.

PLATEN. Roller within smaller printers used to implement friction feed.

PRINTHEAD. The component in a matrix printer which houses the print wires.

PRINT SPEED. The speed at which the print mechanism can print characters. This is different from throughput.

RS232C. A standard for serial data transmission.

SERIAL TRANSMISSION. Data transmission whereby one bit only is transmitted at any one time – the bits follow each other sequentially down the one transmission line.

SLEW RATE. The speed at which paper is vertically moved through the printer when line feeding or moving to top of form.

TAPE CONTROL VFU. Contains forms length on paper tape and is addressed by system to select form length.

THROUGHPUT. The speed at which printed matter is produced by the printer, taking into consideration spacing, line feeds, and so on.

TOF. Top Of Form – first print line of form.

TRACTOR FEED. Device for guiding continuous stationery.

XON – XOFF. A protocol or handshaking routine which controls the flow of data over a serial interface.

Our thanks to BDS of Melbourne, who allowed us to make use of their article 'All You Ever Wanted To Know About Printer Systems ...' when compiling this introduction to printers. BDS can be contacted on (03) 241-8901 and at branches in mainland capitals. □

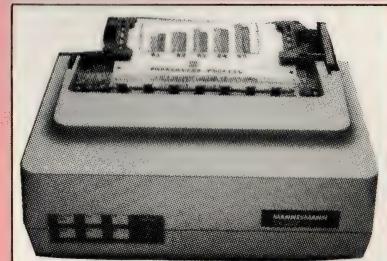
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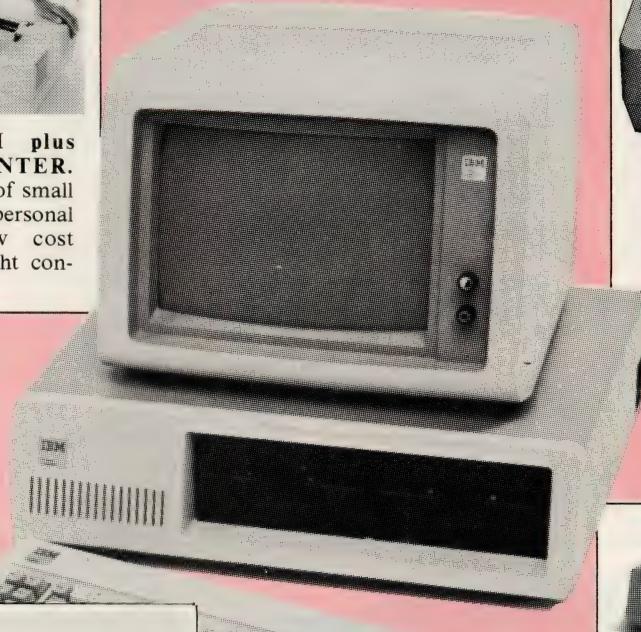
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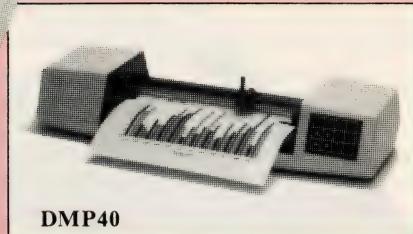
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PRINTER FEATURE

The Brother HR-15

Michael Mee met the common frustration when looking for a printer – the ones with a print quality good enough for display work cost more than the original micro! Then he came across the Brother HR-15...

A COMMON excuse for buying a computer is the 'need' to use it for word processing. The pitfall in this approach is that the price of the letter-quality printer required (right justification loses its effect on a dot matrix printer) is usually more than the computer!

Until recently there has been little option but to fork out a minimum of \$2000 for a daisywheel, buy a converted typewriter (or convert your own), find someone who owned a good printer, or resign yourself to dot matrix quality – if you could even afford that! Now there is another alternative, in the form of the Brother HR-15. This is a daisywheel printer with features that would make the big guys blush!

First let me assure you that the HR-15 is not a converted typewriter. People who have taken that path will tell you of the pitfalls: frequent breakdowns because of the unanticipated load and loss of all the good features such as proportional spacing, automatic underlining, super/subscripting and so on being the main complaints. In fact the HR-15 is the opposite; you can buy a keyboard as

an option and use the printer as a typewriter!

Overview

The printer is housed in an attractive off-white case with a sloping front, on which are mounted the usual printer switches and indicators plus a few extras. From the left these are: power and alarm indicator, copy button, proportional spacing indicator, pitch indicators (10, 12, 15), pitch select, line space indicators (1, 1.5, 2), line spacing select, top-of-form, line feed, select indicator and switch.

At the top right are the friction release and bail release levers. On the back panel you find the optional keyboard connector, two DIP switches for option selection, 'option' connector used with the tractor/paper feed accessories and either a Centronics or RS-232 connector, depending on the option selected.

The power switch is recessed into the left-hand side. A platen knob, also on the left, is used when adjusting a new sheet of paper. Behind the platen is a high paper rest and adjustable guide.

Lifting the lid (which deactivates the printer with no loss of characters if operating) reveals the daisywheel and its ribbon cartridge. Hidden behind the platen and well away from *der fingerpolken numskulls* are the enclosed electronics, which include a microprocessor, 4K ROM, 3K RAM (expandable to 5K) and a switching power supply. Remov-

ing the cover proper makes this all easily accessible. The overall impression inside is of a very neat, well thought-out design.

Using The Printer

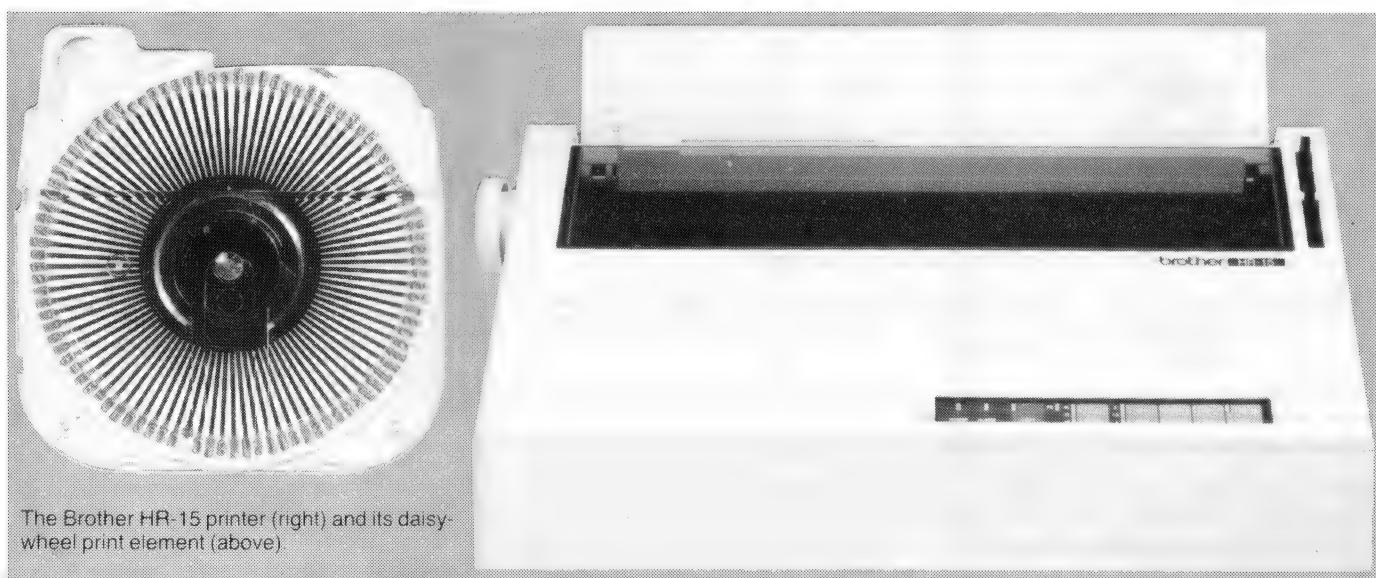
The printer is very easy to use. Paper insertion is made simple with an auto-feed mechanism; you simply place the paper at the back of the platen, press 'select' to take the printer off-line and then press 'top-of-form'. The paper is fed to 30 mm from the top of the page, with the bail automatically being raised and lowered. (The novelty of this still hasn't worn off!) With a bit of practice, no adjustment is required. Pressing 'top-of-form' a second time will eject the paper.

With the paper inserted, printing begins at 12 characters per second (cps). Be warned, this is *not* fast; but note that the built-in buffer will store a page (2K), which frees up your computer very quickly for short printouts. Your everyday dot matrix will handle at least 50 cps, which must be the main reason you pay \$2000 for most other daisywheels, as they typically print at 40 cps.

The HR-15 doesn't make a lot of noise, the cover being designed to eliminate as much as possible. It is certainly much quieter than a NEC Spinwriter, for example (but four times as slow...).

Features

The printer is compatible with Brother typewriters. This means that ribbons available include one-pass, four-pass and correctible carbon as well as fabric. There are many daisywheel typestyles ►

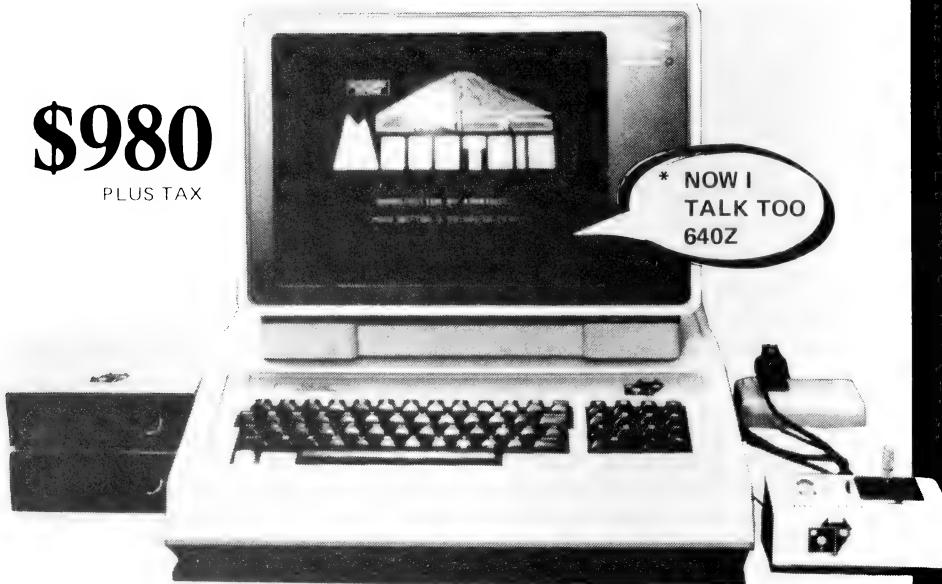


The Brother HR-15 printer (right) and its daisywheel print element (above).

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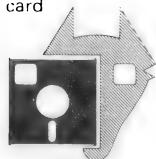


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to choose from, including symbols and italics in three pitches and proportional spacing. These are very easy to change, even in mid-print. A one-pass red ribbon (or correction ribbon) is software-selectable (and looks very good).

The printer has an 2K internal buffer (expandable to 4K), which speeds up printing from the computer's view. The printer can make up to four carbon copies if needed, but can also store a page for multiple reprints using the copy button.

The printer is software compatible with the Diablo 1610/1620 (and the Sprint 5) which means it is completely software controllable. Using Wordstar (for example) you can have proportional spacing with right justification (which is how books and this magazine are printed), change of pitch (character width), true bold printing (by spacing 120th of an inch and overprinting), sub/superscripts, and much more.

If your word processor cannot drive the printer to full advantage, there is still hope. Pitch, including proportional spacing and line height, can be selected from the front panel as well as in software. Also, alternative control sequences allow you to enter bold printing mode (or double, underline, strike out, red ribbon) and exit it after several characters. The printer also prints bi-directionally to speed things up.

Manual

The 46-page manual is very good. The beginning user is well catered for, with clear step-by-step instructions for loading the paper, changing ribbons and daisywheels, along with lots of well-labelled pictures and line drawings. Precise descriptions are given of all alarm-causing conditions (cover open, ribbon

end) as well as a (rather simplistic) troubleshooting guide and hints on printer maintenance and precautions. A complete list of all daisywheels available is provided, as well as printed tables showing each typeface.

The more experienced user is provided with a complete list of software codes as well as (fairly) detailed descriptions of each. They are then re-tabulated into functional blocks which makes for easy cross reference. Several detailed examples are also provided. The hardware side is not neglected either. Clear timing diagrams are provided for both the serial and parallel interfaces as well as pin by pin descriptions and internal line termination details. Schematics are not provided, though I found the technical staff at Brother Australia to be very helpful.

Summary

You can probably tell that I'm very pleased with the HR-15. The price compares very favourably with the average dot matrix, and yet it performs like a \$2000 machine (except for speed).

Its compatibility with the Diablo 1610 and the resultant ability to take advantage of all Wordstar's best features is what I find most attractive. For program listings it can be a little tedious (especially long assembler listings), but this is amply repaid by the quality of letters, tutorials and so on.

Note that this is just the forerunner of printers of a similar quality and price; both Smith-Corona and President offer similarly priced daisywheel printers. As usual it can pay to shop around for prices. The main retailers of the HR-15 seem to be typewriter stores themselves; no doubt Brother can help you with the location of these. □

Specification and Report Card

Printer:	Brother HR-15
Print speed:	13 cps (11 cps pica pitch, Shannon text)
Daisywheel life:	10 million characters
Characters/line:	110 characters (1/10"); 132 characters (1/12"); 165 characters (1/15")
Width:	13.5 inches (approx. 34 cm)
Noise:	65 dB or less
Dimensions:	464 mm wide by 339 mm deep by 165 mm high
Weight:	8.9 kg
Options:	Tractor feed — \$189 Single-sheet feed — \$449 Keyboard — \$349
Price (recommended):	Centronics — \$849; RS232 — \$899 (including tax)
Best points:	Price, proportional spacing, quality, buffer
Worst points:	Speed (to be expected)

Ratings:	excellent	very good	good	poor
Documentation:		•		
Ease of use:	•			
Functionality:		•		
Support:		•		
Value for money:	•			



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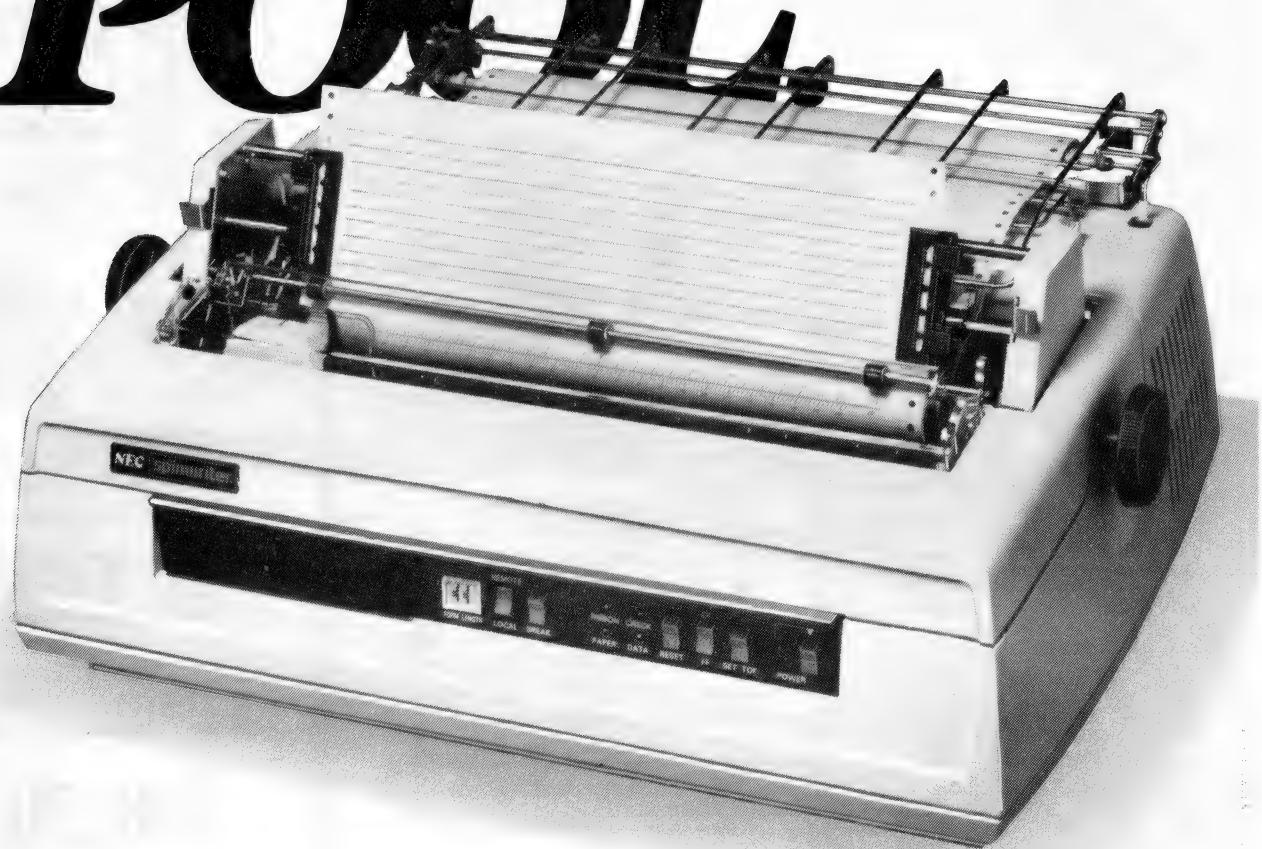
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PRINTER FEATURE

The Osborne/TEC Connection

The Osborne 1 computer and the TEC F-10 daisywheel printer make a first-class combination for business use, but marrying the two can present a few problems. J J Sullivan gives some hints on how to do it.

MANY PEOPLE think of the Osborne as just a portable machine, but it is a lot more than that. When I was choosing a computer, there were a few specifications it had to meet. Essentially I wanted an efficient word processor with the ability to cope with accounting work, and it had to run CP/M because that is where the software is.

I didn't have any need for games, graphics, colour or computerised music, but I was interested in anything that could handle correspondence and keep editors and my accountant happy.

When the Osborne first came out, I looked at the specifications, the software and the price (particularly the price) and decided this was the machine I wanted. The fact that it was also a portable wasn't an important factor for my applications. I still remember my sur-

prise when I saw the list of software that came with the machine – and I wondered why no-one had thought of providing free software before. In particular, I wondered why I hadn't thought of it!

However, the Osborne had one major drawback – the single-density disks. There was mention of double-density disks on the horizon so I waited a few months before buying to get a double-density machine. Even with double-density disks and 183K of storage on each disk, though, there are times when I wish I had quad density. A 10 megabyte hard disk would make me really happy.

Additional space would be handy on data disks, although I haven't found it really necessary yet, but the system disks are getting thoroughly cluttered.

One of my first moves was to copy PIP from the Wordstar disk because I got tired of switching disks when I needed to use it. I have also added some of the CP/M Users' Group utilities, so there is not much space left on any of the system disks. When I get a few more CP/MUG volumes, the problem will be deciding which utilities get pushed aside.

CP/MUG Volume 66 is devoted to a useful series of help messages on CP/

M, MBASIC and CBASIC2, but they do take up a lot of space. Fortunately, Wordstar and Supercalc already have all the help messages they can use.

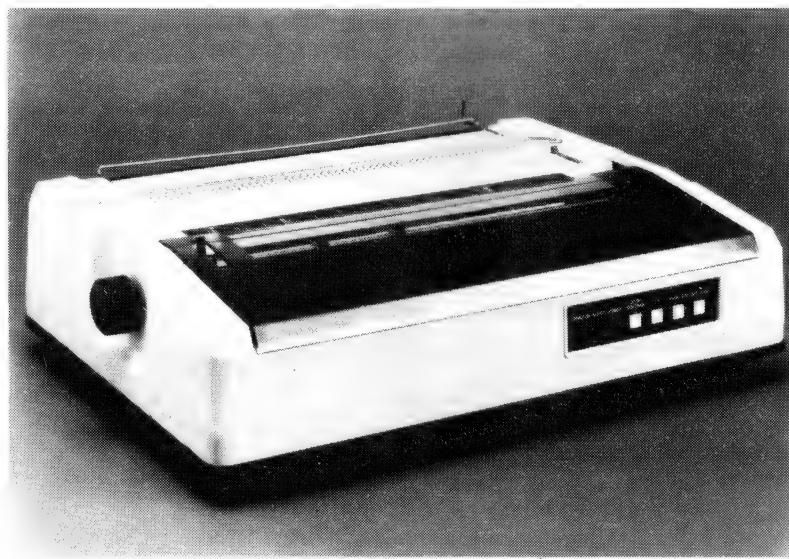
Cleaning Up A Disk

I found one of the most useful CP/MUG utilities to be a little program called CLEANUP.COM on Volume 40. It lists a disk directory, one program at a time, asking whether to type the program, erase it, or leave it alone. (For some reason, CLEANUP.COM is not listed in the disk catalogue, although it is described in ABSTRACT.040.)

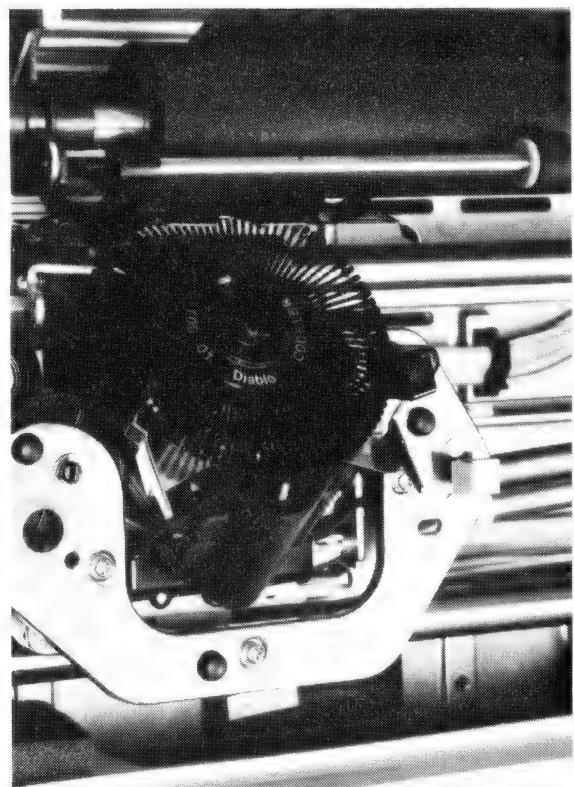
Put a few programs like these on the systems disk and 183K of storage starts to look small.

The keyboard was another point that concerned me when I was looking at computers. It had to have an easy action that would not irritate a fast typist, and keyboards can vary greatly. The Osborne keyboard passed that test easily. The action is quite different from an IBM Selectric or a DEC terminal, but I couldn't say which is best of the three.

There are a few portable computers on the market these days, but in my opinion they all lose out to the Osborne either on price or on the quality of the ▶



The TEC F-10 daisywheel printer (above), and a close-up of its daisywheel print element in action (right).





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software. Adam Osborne got in first and he picked the best software.

Undoubtedly some people will question this. I have seen criticisms of Wordstar in letters and reviews in magazines, but the recurrent whinge seems to be only that Wordstar is too hard to learn, not about what the program can do. It certainly takes a lot of study and practice but the result is worth it.

The main criticism of the Osborne is aimed at the small screen and the 52 characters it shows. Certainly it can be a bit hard on the eyes, but an external monitor is easily plugged in, and the 80-column board should help overcome this problem too.

In the meantime, using the small screen is no real problem. For typing copy in, I set the right margin to 52, which makes the material easily readable without having to scroll the screen horizontally. If I have to read outside material, such as CP/MUG abstracts and .DOC files, I reformat it to 52 characters. Wordstar lets me keep it that way on disk or abandon it with Control-KQ and leave the original format on the disk, as I choose.

Some of the Wordstar default settings need to be changed before entering, and I put them all on one of the user-definable keys (or function keys, in the Osborne manual's terminology). The Control-0 key is set as follows: Control JH2 (CR) Control OR52 (CR) Control ONA (CR) Control OJ (without spaces, of course). Those settings change the help level to 2 and get rid of the omni-present menu, set the right margin to 52 characters, clear all the tab settings and switch the justification off.

No Justification For It . . .

Most word processors seem to default to justification on, although I ran a word processor on my previous computer for about three years and never used the justification, apart from testing and experimenting. If you're writing a newsletter or a manual, justification may be necessary, but how often do people write manuals? In my opinion default to justification off would be a more useful setting.

When the material has been typed into the Osborne and checked for accuracy, I reset the right margin to, say, 62 characters with Control OR62 and reformat everything with Control QQ Control B. Normally, Control B reformats just one paragraph and stops. Control QQ is a repeat command; it repeats the next keystroke or command, whatever it may be, and continues repeating until it is stopped by the space bar or, with Control B, until it runs out of paragraphs to reformat.

One other thing will stop the repeat command. If Wordstar halts to ask about the hyphenation on a line, it also switches the repeat off and the reformatting must be restarted with Control QQ Control B. Once the material is reformatted, it can be sent to the printer – and the printer is often a major problem for computer owners.

Attaching The Printer

For business or professional use a daisywheel is really the only choice; dot matrix printers just don't give good enough copy unless they're the very expensive models costing as much as a daisywheel.

I liked what I knew of the TEC F-10, also sold as the C Itoh F-10, the Starwriter F-10, the Dick Smith daisywheel and probably under a few other names. It seemed odd that I could only find one very brief review of this printer in all the computer magazines I read. The price of the F-10 dropped sharply this year and it was being advertised at \$1600 tax paid for the Centronics parallel version – but the new Federal Government's devaluation of the dollar put a quick end to that.

I looked at the prices of serial and parallel models and could not see any reason to pay the extra money involved in buying a serial interface model, so it had to be a parallel unit. Then the problems started.

It was a Saturday morning with a long weekend coming up and the salesman told me, with a happy laugh, that the manual had not been packed with the printer and that was the only machine available until the following week.

I remembered that the Osborne manual gave the wiring details for a Centronics parallel printer, so I decided to take the machine with me and at least get it running over the weekend, leaving the fine details until the manual arrived.

I had the necessary plugs, and a few phone calls to patient friends and a bit of fast driving gave me some 26-wire ribbon cable. When I wired the printer plug I was surprised by the close matching of the computer and printer pinouts, but I assumed the people who wrote the Osborne manual knew what they were doing.

I fired up the printer and it printed gibberish. I checked the plug wiring and checked it again. It was correct. That meant either the printer was not wired to the Centronics parallel standard or the Osborne manual was wrong.

I went to my files and found a couple of Osborne columns that had appeared in *Your Computer*. I also remembered that the Dick Smith catalogue carried a Centronics pin diagram.

The *Your Computer* columns gave de-

tails for wiring a Centronics printer and a Smith-Corona daisywheel to the Osborne. The Dick Smith catalogue diagram bore no relation to the Centronics printer wiring but it did come fairly close to the Smith-Corona. The catalogue diagram had no provision for data line 7. I subsequently discovered that the printer doesn't need data line 7 but it worried me at the time.

I vaguely remembered reading somewhere that Centronics printers don't use the Centronics standard any longer. Deciding that two out of four was good enough so I would go that way, I combined the Smith-Corona and the Dick Smith details, and came up with the following:

Osborne	F-10
1	2
2	6
3	3
4	7
5	4
6	8
7	5
8	9
11	1
12	16
15	11
17	10
19	13

I rewired the plug and printed out my one-sentence test program. At least the printer turned out intelligible English, but it was double spacing everything, printing both forward and backward, only getting part way back to the left hand margin, mixing up the spacing between words and doing a few other silly things.

That was when I realised that the Wordstar install routine outlined in the manual was not as simple as many magazine writers have claimed. I don't know how the official Wordstar manual handles it, but the Osborne manual doesn't want anything to do with parallel interface daisywheels. It states: "If your printer is a high-quality daisywheel printer, it will probably be connected to the serial port (a few models might interface like a Centronics parallel printer, however, so you'd better check)". From there on, it ignores parallel daisywheels.

I read somewhere that the F-10 printer matched the configuration of the Qume Sprint, so I had specified the Qume Sprint in the installation, and that caused most of the trouble. After redoing the installation many times, with different answers, I found I had to specify the printer as a "Teletype-like printer that can backspace". Nothing else would work.

Anyone interested in superscripts and

Continued on Page 39

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KILOPEDE revolves around a nasty Centipede charging down through the garden towards you. When your beetle makes a direct hit, the Centipede breaks into two! Now you have double trouble. Watch out for the fleas, bugs and most of all, the gardener's boot!

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TRS BEE is a package of three programs that loads TRS-80 Model 1 and 3 program tapes into the MicroBee without any additional hardware. Although some program editing will still be required prior to their running, the majority of program typing time is saved by TRSBEE. The first program loads TRS-80 BASIC programs into MicroWorld BASIC. Most programs may then be edited and run. The second program in the package loads any TRS-80 machine code file into MicroBee memory. The third program loads TRS-80 assembler files into the MicroBee EDITOR/ASSEMBLER. Any TRS-80 Model 1 or 3 tape may be loaded. TRSBEE opens up a whole new world of possible software on your MicroBee!

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TAPE DOCTOR is an easy to use programming aid for loading and saving programmes on tape. TAPE DOCTOR will load nearly any program from tape, regardless of protection system. BAD LOAD files may be loaded also and TAPE DOCTOR will aid in finding the faulty byte. Saving files of any type become a breeze. Create Auto Start BASIC files and files that include both BASIC and machine code subroutines. Comes complete with a monitor. If you use tapes at all, TAPE DOCTOR is a must.

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DEBUG is a utility program to enable the debugging of machine code programs as they are written on the MicroBee using EDASM. The program operates at the assembler level. Break points are inserted in the source code as calls to a subroutine. The source code, with included breakpoints, is then assembled and the resulting code is executed in the normal way. Program execution will halt at the first break point encountered with a display of the internal Z80 registers. With execution halted, registers can be examined and modified as can memory locations. Execution can then proceed until the next breakpoint is encountered. By means of breakpoints inserted in the source code, the programmer can examine all or any part of the operation of the program on a statement by statement basis.

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LOGO BEE is a graphics language. Specifically designed to introduce children to computer programming, LOGO BEE is destined to become a standard on the MicroBee. Both simple and intricate designs may easily be drawn on the screen in hi-res through use of short and easy to understand LOGO BEE programs.

LOGO BEE programs are based on an imaginary turtle moving about the screen leaving a trail behind him. The turtle may be moved in any direction for a given distance. He may then be turned any number of degrees and moved again. The trail may also be turned on or off. Each short routine is given a name, such as SQUARE, CIRCLE or TRIANGLE, depending on the shape created. These routines may be used within other routines. In this way, the concepts of programming can be easily introduced to young children and adults who have had no previous computer experience.

LOGO BEE was written specifically for MicroBee graphics. The program is essentially idiot proof and is a joy to use.

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COMPOSER BEE II is an excellent aid in learning music theory. Write your own melody on the screen staff and listen to the result. You may now transpose, add to or modify your tune. The notes on the staffs will change accordingly and you may again listen to the result. COMPOSER BEE II is graphics orientated, has a 2 octave range, handles accidentals, non-standard timing and repeated sections of music. Teachers and students alike will welcome COMPOSER BEE II.

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subscripts or red and black ribbon shifts would need to go into the "special modifications" and set the necessary bytes, which can be found in the tables in the printer manual. I didn't bother — superscripts and daisywheels don't really go together.

With these changes made, the printer worked properly, except that it still double-spaced everything. Since that was obviously due to switch settings in the printer, I had to wait for the manual. When I read the manual, I found the chapter on the serial interface quite lucidly written, while the material on the parallel interface was almost unintelligible. Apparently nobody takes the parallel interface seriously.

Nobody Takes Us Seriously

For example, the parallel interface chapter carries a section explaining the functions of the interface signals. The following are a couple of excerpts:

DATA 1-8

a) Each signal receives the first bit of information of the data.

ACK

a) This is the SP character code as one of the control codes which is used after the completion of operation. This represents the data request output from the printer with the data stored in its buffer.

Fortunately, much of this material can be ignored. However, the switches reached through a slot in the front panel cannot be; most can be left at the factory setting until there is a need to alter them for such things as proportional spacing, but a few must be changed at the start:

SW404 and SW405 must be set to "no parity".

SW412 must be set to CR.

SW414 is incorrect in the manual. It must be open for Pica (10 pitch) and closed for Elite (12 pitch).

It is advisable to check all the other switches against the manual just in case one has been altered for some reason.

A tiny screwdriver is handy for setting these switches because the access slot is extraordinarily narrow. It is important to make sure that each switch is fully over. Once these settings had been made, the printer started running properly and turning out a first-class print job.

The TEC comes with two ribbons, a fabric and a multi-strike carbon. The quality is not quite as good as my IBM

Selectric with a film ribbon, but it is not far behind. The double strike setting would go a long way towards closing this gap. The Osborne manual suggests that double strike, used with a carbon ribbon, will give an impression of sharpness and quality to a document. I tested this theory and found that it worked.

The Real Speed

A printout of 15,781 bytes of solid text showed the printer was running at 29 characters per second, roughly the same speed as most matrix printers, despite their claims for 80 and 100 characters per second.

An interesting point is that the manual lists several options, including sensors for paper out, ribbon out and cover off, which all came as standard on my machine. Another option listed is a word processing expansion function, which merely duplicates some of the WordStar controls, such as boldstrike and underscore. (The printer sounds like a riot in a bee-hive when it is doing a boldstrike routine.) I understand that a new manual has been issued, so some of these inaccuracies may have been corrected.

The F-10 provides proportional spacing, but the correct wheel must be fitted for this.

One common use for a word processor is correspondence. There have been many complaints in magazines about Wordstar and a daisywheel being unsatisfactory because of problems with envelopes, but there is an easy solution. I keep a permanent letter format on disk with my address, question marks for the date as a reminder not to forget it, a few line spaces and the signature details. At the top of the format is .OP to get rid of the page numbering, and .PA is set underneath the signature to force a page break. Immediately under the page break line is .PO 25 to give a 25-character offset.

When I have to type a letter, I copy the format, giving it the identification of the letter, then call the copy off disk. This step is necessary, otherwise I would lose the format. I then type in the current date, followed by the body of the letter. The next step is to block the internal address and copy it down under the .PO 25, then release the block with a Control KH. This gives the envelope address, and the offset places it correctly on the envelope. Don't forget to set Wordstar to stop at the end of every page.

None of this is new. In fact, the envelope routine appeared in a column in *Interface Age*. A series of form letters, using MailMerge, would pose a different envelope problem, but I have not checked this.

Faster In One-Way Traffic

The F-10 has provision for bi-directional printing or line mode, set by one of the panel switches. I timed the same text printout in line mode and found the printer was running at just over 34 characters per second, compared with the 29 characters per second of the bi-directional mode. I decided to leave it permanently in line mode. It makes no difference to the WordStar commands.

Line mode really comes into its own when the printer is churning out a series of Supercalc spreadsheets on 15-1/8 inch computer paper (384 mm for the metrically minded).

It can be disconcerting to see the printer hesitate after printing a column total, then slide smoothly across the sheet to find the next column with a total. Instead of spacing across the page, as a typewriter would, the F-10 waits for all the spacing information, then makes one swoop to the right location.

When I first set the switch for line mode for a Supercalc printout, I just took the cover off without switching the power off. When the printout started, the machine was still in serial mode, printing in one direction only.

It seems the switch setting only takes effect on power up. Incidentally, Supercalc printouts look better if the column and row designations are removed with the Global command B (for borders). For spreadsheet work, it is advisable to buy a 12 pitch daisywheel and set the panel switch to Elite spacing. A 10 pitch wheel takes up a bit too much space. A 12 pitch wheel has another advantage in that the letter shapes are finer and the resulting print looks better with a carbon ribbon. The 12 pitch wheel has one big disadvantage, in that it only has about half the life of a 10 pitch wheel, probably because of the thinner letter outlines.

A listing of Diablo type wheels put out by Mitsui Computer Systems gives the average lifespan of 10 pitch wheels as five to seven million characters. For 12 pitch wheels, it is two to four million characters. Metal or metallised plastic wheels would undoubtedly have a longer life, but the F-10 will not accept them. This is normal for daisywheel printers; a machine designed for plastic wheels will give higher speeds but can not use the heavier metal or metallised plastic wheels.

Now that the computer and printer are running smoothly together, I find the combination an excellent one. It is certainly intended for business use, and those wanting games and colour will probably look elsewhere, although I notice quite a few games listed in the CP/MUG disk catalogue. □

OPRINTER FEATURE

Juki 6100

The low end of the printer market is now dominated almost exclusively by Japanese manufacturers, as will be obvious from the large number of Japanese printers reviewed by Les Bell in this issue. The Juki 6100, made by Mitsui, is one of them.

THE JUKI 6100 printer from Mitsui is a low-cost daisywheel machine. Unlike most low-cost daisies, this one does not look like a modified typewriter, nor indeed is it one.

The Juki print mechanism is based on a linear motor design, so there are no taut cables winding around the base of the machine. Instead, the printhead rides on a metal bar which houses the linear motor, and there is no evidence of other moving parts. This should improve reliability.

The front of the machine is raked back in a futuristic style, with an integrated control panel which has a slide switch for print spacing (10, 12 or 15 pitch, or proportional), as well as reset, on/off, line and form feed. At the rear is the power inlet, parallel interface socket (serial optional) and the on/off switch.

Easy To Load

The top cover lifts out of position to reveal a standard IBM Selectric II ribbon, which is easy to obtain from most office supplies shops. The print wheel is the Triumph Adler type, and is particularly easy to change. With most daisies, the printhead must be tilted back and the print wheel grasped firmly; a messy procedure. The Juki print wheel simply drops into place and the drive shaft rotates until it clicks into position, so that it is cleanly self-loading.

Since it does not have a tractor feed as standard, the 6100 single-sheet loading is considerably easier than on the Mitsui MC2100, reviewed elsewhere in this issue. The paper just drops into place and is easy to keep straight. Print quality is excellent, as the accompanying sample will show.

The 6100 is rated at 18 cps, and while

it was impossible to run an extended test due to single-sheet insertion delays, it gave the impression of running close to that speed. In fact, because of the clicking of the daisywheel, it gives a subjective impression of even greater speed, making the waiting a bit more bearable.

Character and line spacing are controllable by escape sequences, to 1/120th of

an inch horizontally and 1/96th of an inch vertically. This enables the use of the printer for plotting.

The printer has a 2 Kbyte buffer as standard, and this is expandable to 8 Kbytes. Other options include bi-directional and uni-directional tractor feeds and a cut-sheet feeder.

The Juki 6100 is a very impressive printer, particularly at its price of \$995.00. It is solidly built, and its simplicity of construction bodes well for reliability (an MTBF of 2500 hours is claimed). The print quality is excellent and it runs well up to the claimed speed. It is a classy printer indeed. □



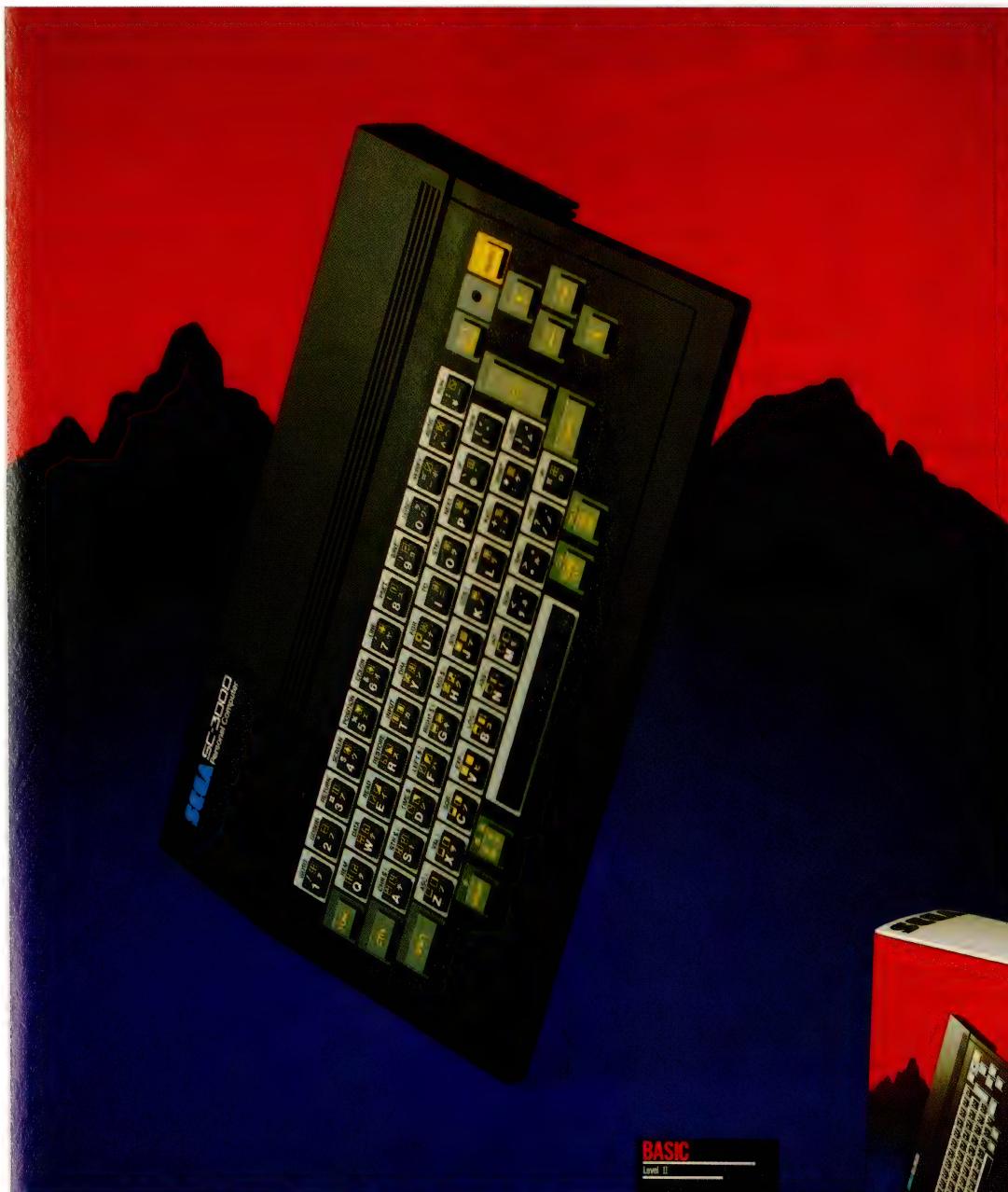
H WE looked at the creation of a database file, ng at the file using various dBase II commands. I'll continue by looking at the various full-scre in depth, together with the editing functions wh vides.

I dentally, one of the things that I continually n people who write BASIC programs and then don't sion of BASIC on what machine they are writing. roke my own rule by not telling you what version as using. All examples in this series will work .3 and later. I'm currently using version 2.31, give shortly, and I'll apprise you of any differ versions where necessary.

The Juki 6100 (top) and a sample of the print it produces.

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PRINTER FEATURE

Toshiba P1350

Here's the current state of the art in high-quality dot matrix printers. Les Bell found the Toshiba P1350 to be a solidly built high-speed dot matrix machine with a high-quality multi-strike mode which still operates at acceptable speed.

THE P1350 is a larger printer than the others reviewed here, and a faster one. The front panel has the usual on/off-line, form feed and line feed buttons, while at the back is the power inlet, power switch and interface connector.

The P1350 is available with either a parallel or serial interface. Our parallel interface model worked fine, although we have heard that the serial version shows problems when working with hard-wired handshaking (but is fine using a software protocol).

Like most dot matrix printers, the P1350 uses a stepper motor to position the printhead as it moves across the page. In draft mode that's fine, but in near-letter-quality mode it is stepping the head over small increments so fast that it lets out a piercing whine which seems to be louder than the impact of the printhead.

Actually the body of the printer provides pretty good sound insulation, so it's not that bad, but it's definitely noticeable.

The draft mode of the P1350 runs at a maximum of 192 cps in 12 pitch, and 160 cps in 10 pitch. When running in high-resolution mode, the machine slows down to 93 cps in 12 pitch and 78 cps in 10 pitch. It's capable of 100 cps when using proportional spacing. These speeds are still considerably faster than the vast majority of daisywheel printers.

In near-letter-quality mode, the print quality is not bad at all. You can see it's not printed by a daisywheel, but it's quite acceptable, and nowadays it seems people are more prepared to accept neat dot matrix type where previ-

ously only IBM Selectric type would do.

In fact, the P1350 prints 36 horizontal dots per character in high-res mode, and does so in one pass — which considerably improves the speed as the head does not waste time returning to make a second pass. However, high-resolution printing still takes place in a forward direction only.

Variety Of Typefaces

Three typefaces are available, although only two can be installed in the machine at a time: Courier in 10 pitch, Prestige Elite in 10 and 12 pitch, and Toshiba Original, available in both pitches and proportional spacing. The

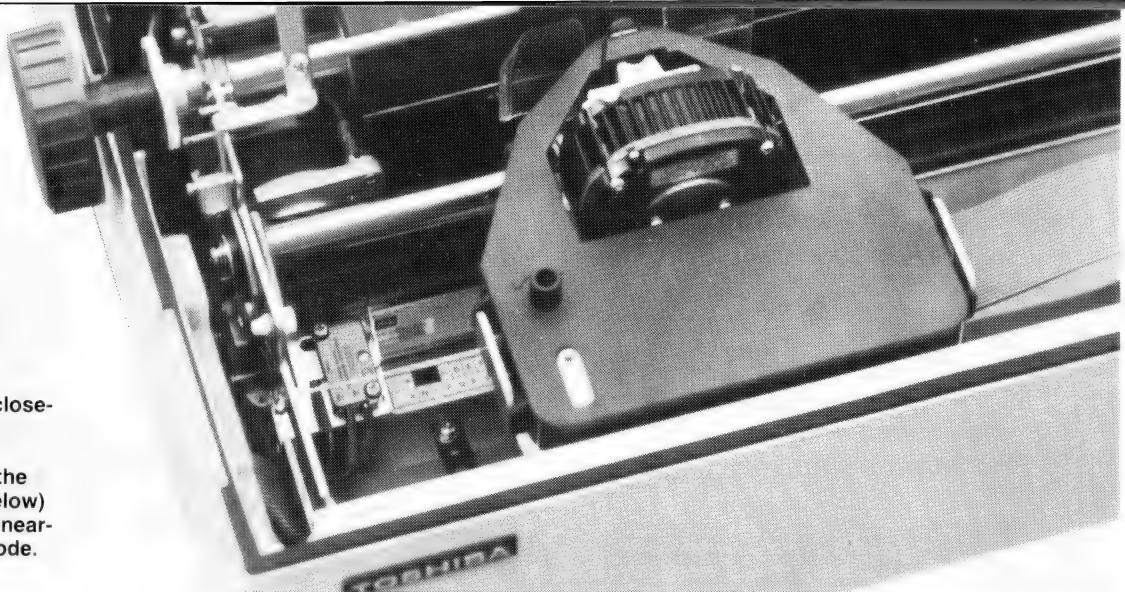
machine must always have its draft font installed for high-speed printing.

In addition, a range of additional fonts is available through what Toshiba distributor Atac calls 'Font Packs'. These plug into an additional harness under the top cover, and allow the user to select between a wide range of italic and foreign language fonts.

The printer is solidly made and would stand up well to heavy duty cycle usage. It works well in high-resolution mode, with a pleasing character set, and the draft mode is very fast and quite readable.

The P1350 sells for \$3150 including tax, while the additional font harness is \$201, with fonts \$201 each. A tractor feed is available at \$283 including tax, and a cut-sheet feeder for \$1530 including tax. Our review sample was supplied by Atac Pty Ltd, 55 Lavender Street, Milsons Point NSW 2061. □





Left: The P1350, with a close-up of its touch-sensitive controls.

Right: A detailed view of the print mechanism, and (below) examples of the P1350 in near-letter-quality and draft mode.

But for the hard core, the real fun comes from the fact that there are a whole set of instructions and registers which users can access by tickling the operating system and which allow operators to do such things as; use the alphanumeric registers for data storage, shift the data/program partition at will to protect data registers, save valuable bytes by assembling print-

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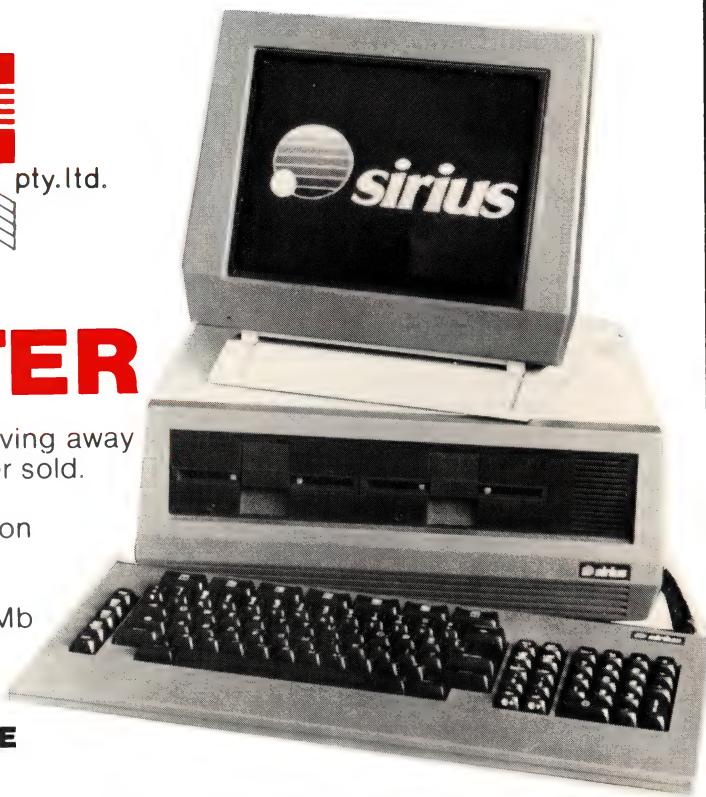
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PRINTER FEATURE

NEC Pinwriter

The Pinwriter is NEC's first serious attempt at a high-speed dot matrix printer, although it's well-known for the quality of its Spinwriter letter-quality printer. According to Les Bell, the Pinwriter establishes the company as a force to be reckoned with in this market.

THE PINWRITER P1 is a small printer; it actually seems larger than it really is and has a chunky, solid feel. It is finished in a light chocolate brown colour with a small control panel at top right. There's the usual on/off-line button, top of form and line feed buttons; curiously, the line feed does not auto repeat when you hold it down.

At the right there's a knob for the platen, and a concentric control which releases the pressure bar and the platen grip. Single-sheet paper is inserted at the back of the platen and this knob rotated to release the pressure bar, whereupon the paper automatically feeds into the correct position.

The Pinwriter is rated at a maximum of 180 characters per second, and I'm prepared to believe it; in fact, when I first switched it on, it was in one of its high-resolution modes, and I thought it was one of the draft modes. Which brings me neatly to my next point.

Fine Print

The character set of the P1 is still obviously a dot matrix set and cannot be mistaken for a daisywheel. It's optimised, if that is the word, towards speed rather than print quality. Ironically, the print is still fine and precise, and gives the impression that a font more like conventional typestyles would be possible.

In its nlq (near-letter-quality) mode, the Pinwriter drops to around 90 cps, although that's probably fast enough for me (mind you, I said that about my first printer). The Pinwriter does have a graphics mode, though to be honest, the manual made it seem to be a bit hard; basically it's a matter of outputting bytes with the appropriate bit set, and is not complex at all.

In addition, the P1 has all the usual compressed and expanded print modes

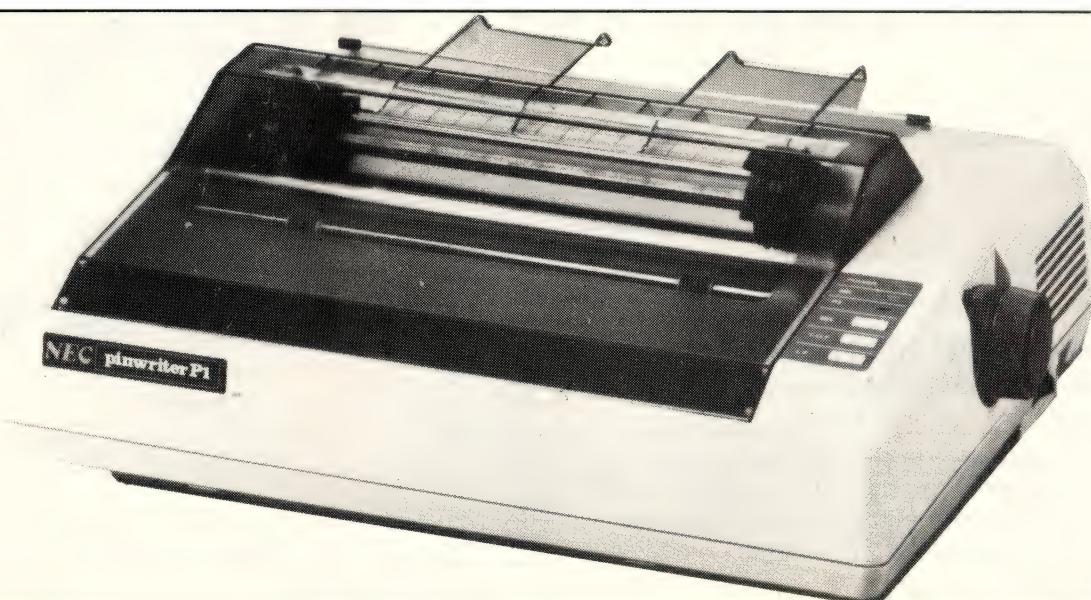
that people hardly seem to use, as well as vertical forms unit control, which I'm sure nobody uses.

The exterior design of the P1 is one of the more pleasing of the current batch of printers; it's compact yet looks and feels solid and modern. A recessed transparent top acts as a noise baffle, and has a slot where the paper emerges. Funnily enough, in the light of past experiences, the paper emerges through this slot without any cajoling or crumpling!

An optional tractor feed is available, which consists of the tractor mechanism, paper guide and a perspex cover which fits over the tractor. Since the instructions were printed in Japanese, it took me a while to figure out how the tractor feed was fitted, but I got there in the end, managed to close the lid on it, and it worked fine.

Jinglish Manual

Like most Japanese printer manuals, the Pinwriter manual was terse, to say the least. It was also couched in Jinglish, such as the fascinating information that SW1-4 set OFF sets the ▶



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form length (I assume that's what FF means) to 66 inches. My experiments were always out by a factor of six or so. Still, we are all getting pretty good at wrestling with Japanese printer manuals by now ...

The internal construction of the machine seems pretty robust. The print-head is moved by a toothed rubber belt which should be virtually trouble-free, and the rest of the machine uses metal parts where necessary and nylon or other plastic where appropriate. Nothing there to worry about.

Should service be required, the whole thing comes apart in a few seconds with no tools required. There are a couple of clips under the front edge, then the top cover hinges off from the back, exposing the mechanism, power supply and interface board.

In summary, the Pinwriter seems to be oriented more towards speed than print quality, though the print quality is certainly adequate; it's obviously a high-quality dot matrix printer.

The Pinwriter is priced at \$1094 plus tax, and the tractor feed is \$84 with the cut-sheet guide at \$16, both plus tax. Those prices make it good value for money. This is a quality printer which should give years of service. □

is an ideal language for educational discovery and development at any age or level. ATARI Logo can discover important concepts in a few simple procedures with the language's graphics capabilities. Through knowing it can learn about geometry, maths, a method, language and learning itself.

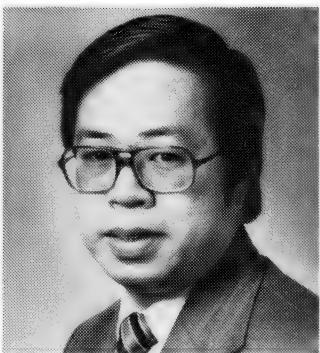
Like most Logo programs, ATARI Logo has four cool looking turtles with collision detection so you can graphics or game play action. Users can even change own turtle shapes and save unlimited shapes on a disc.

Top: Pinwriter HS mode; below: in HDCG mode.

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Like most Logo programs, ATARI Logo has four cool looking turtles with collision detection so you can graphics or game play action. Users can even change own turtle shapes and save unlimited shapes on a disc.

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PRINTER FEATURE

Microbee Printer

Aka Admate DP-80, Aka Micro Graphic Impact Dot Printer; da feds are after dis guy in 49 states — Les Bell reports ...

FORGET THE NAME — this is the printer Applied Technology is selling to match the Microbee. With such a low-priced, high-performance computer, it was important to get good value in a matching printer, and AT has achieved that with this machine.

Interestingly, the Microbee printer is a left-handed one; the platen knob is on the left-hand side of the printer, which is a bit backwards to me. This might be related to the way the tractor feed works 'backwards'; in other words, the paper is fed in over the top and pushed into the platen, rather than being pulled out of

the platen. This arrangement works well, saving the sheet of paper that is often wasted by 'puller' tractor feeds. Shades of WWI biplanes!

The Microbee printer is an 80 cps job, and seems to keep that up quite well. It does not do multi-pass near-letter-quality printing, but has a nice clear character set that is certainly easily readable and is a great improvement over the low-cost dot matrix printers of a few years ago. In fact it approaches the Pinwriter's high-res mode for quality, although it's not quite as fine or fast.

Attractive Price

On the other hand, the price of this printer makes it particularly attractive. At just \$449 with parallel interface or \$549 with serial interface, this has to be a winner. Why, I recall really terrible 40-

column printers at that price just a few years ago!

Print enhancements on the Microbee printer include italics, bold face and all the usual things; interestingly, it's the only printer in the batch I reviewed to offer italics.

The manual supplied with this printer leaves me with mixed feelings. It is well-produced, properly typeset and has some lovely clear diagrams, but Oh! the Jinglish! Try this one for size:

"Carefully lift front of printer unit and make it stands as the bottom of case be vertically (sic) face to you and hold the unit by the one off your hand on the soft surface — see **Figure 2**. Then, remove the shipping screw(s) with a Phillips-head screw driver. After it is removed, gently back the unit to lay flat on a firm ▶



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surface, position the printer front be face to you."

Thank goodness for Figure 2!

Mind you, we've been coping with printer manuals worse than this for quite a few years now, and this one is not bad in comparison with some of the horrors I've seen.

Overall, then, the Microbee printer is the best value out of the group I reviewed. It won't suit everybody, as it is not as fast as some of the others and doesn't boast the versatility of typefaces, but it does what it does very nicely, and I'm surprised that such good quality is available so cheaply. □

I Products Company has announced that ATARI Logo will be in a 16K cartridge that can be used on an ATARI 800 with as little as 16K RAM memory. This is the only version of Logo that can be used with so little memory.

It is an ideal language for educational discovery program development at any age or level. ATARI Logo can discover important concepts in a few simple procedures, particularly with the language's graphics capabilities. Through knowing it can learn about geometry, maths, logic method, language and learning itself.

Like most Logo programs, ATARI Logo has four built-in turtles with collision detection so you can do graphics or game play action. Users can even change their own turtle shapes and save unlimited shapes on disk or disc.

Right and below: Examples of the print produced by the 'Microbee printer'.

```
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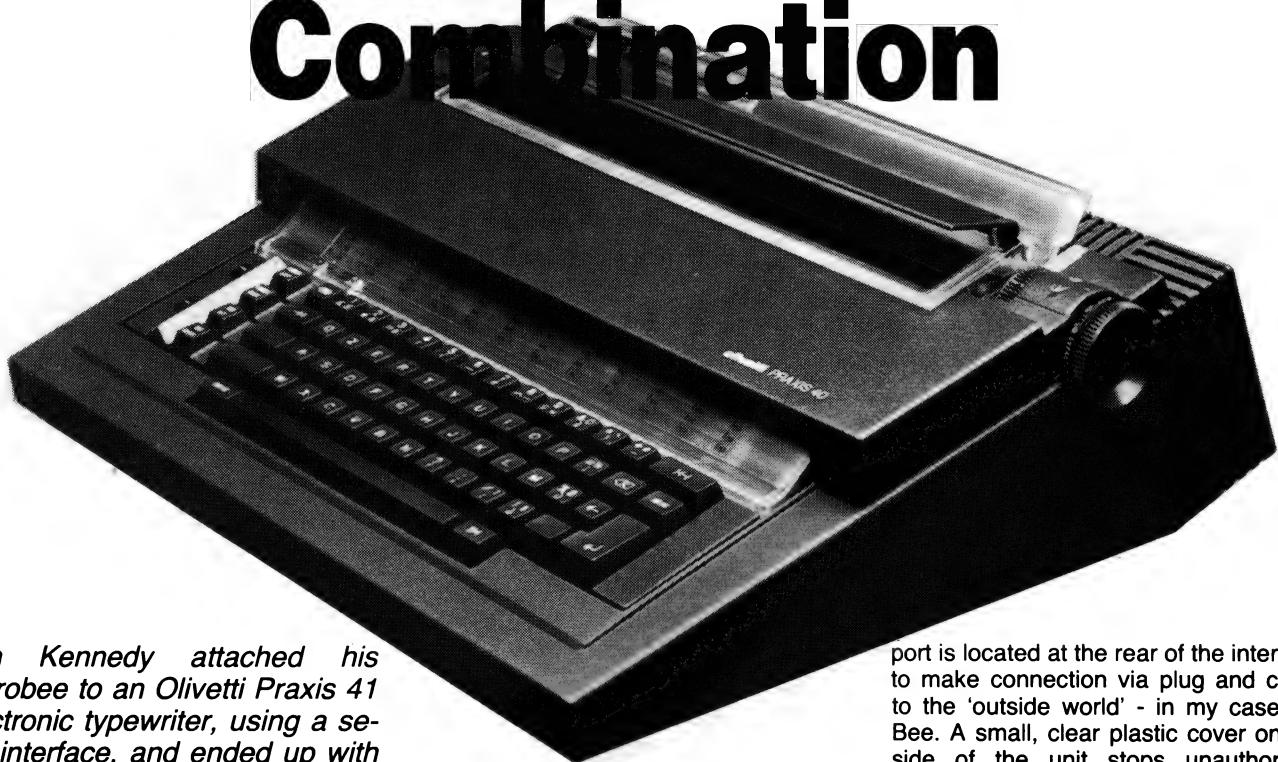
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PRINTER FEATURE

Microbee/Olivetti Combination



Don Kennedy attached his Microbee to an Olivetti Praxis 41 electronic typewriter, using a serial interface, and ended up with an unusual letter-quality printing system.

I ACQUIRED this interesting combination in early April 1983 to help my daughter, who is currently attending business college, and of course for my own use as a letter-quality printer. I use the Praxis for correspondence and for program listing from my 32K Microbee, which is fitted with the Wordbee ROMs. The combination is being used at this very moment to write this article – the more I use the system the more impressed I become with its value for money and the quality of the output that can be achieved.

My local Olivetti agent brought the units round to my place and set them up, and also gave me a short manual (in understandable language) which sets out a few details necessary to set the interface up to suit your system's handshaking requirements. To quote from the interim manual:

"The IM41S is an asynchronous line adaptor based on the Z80 microprocessor, which connects to the Olivetti Praxis

41 compact electronic typewriter. It provides a bi-directional (transmit and receive) serial interface – either RS232C or current loop.

"With the IM41S connected to it, the Praxis 41 may be used as a:
Personal computer console
Letter-quality printer
Typewriter communications terminal."

The Outside

The Praxis 41 looks like most other Olivetti machines – efficient black, with evidence of considerable effort on the part of its designers to provide clean lines coupled with good control and keyboard layout. The serial interface is likewise housed in a wedge-shaped 'package' matching the style of the Praxis 41, and as a bonus providing a numeric keypad along with its other facilities.

The interface connects to the Praxis via a 26-pin connector and a short length of ribbon cable, which allows some degree of flexibility in handling the hardware on your desk. An RS232C

port is located at the rear of the interface to make connection via plug and cable to the 'outside world' – in my case the Bee. A small, clear plastic cover on the side of the unit stops unauthorised 'twiddling' with the DIP switches used to set baud rate and word characteristics and so on.

The typewriter is set up with several options to allow the use of European characters; a second keyboard switch is provided to access some of these seldom-used foreign characters. The typewriter also has an automatic correction facility (with my typing, I find this most helpful). There is the facility to print at 10, 12 or 15-character pitch and also the capacity to return to the last character printed, using the key 'RELOC' in manual mode.

The pitch-change facility can be of value in setting out work, since some of the daisywheels available have dual pitch capability. A wide range of daisywheels is available, including symbols and specialised character sets for optical character recognition (when the Bee gets to that stage).

The interface has controls for mode and print standard so that it is possible to set operation for:

Typewriter only
I/O (interface on)

No print (interrupt printing or as it says, no printing) on the upper slide switch.

On the lower slide switch:

ASCII – sets the interface to 'understand the ASCII character set' - useful for listing your programs (you'll need the OCR series daisywheels)

Normal (needs no explanation)

ISO-N (for future use?)

As I do not yet have the full manual for the interface I can only assume this ISO setting is for a further character set based on one raised by the International Standard Organisation.

Operation

Once the DIP switches and RS232C cable pinout have been sorted out you are ready to run. The externally accessible DIP switches mentioned before enable the selection of baud rate, data word characteristics and line mode. Internal jumpers, normally set by the distributor, determine various circuit connections.

The Bee Microworld BASIC commands 'Llist' and 'Lprint' operate correctly, although my first attempts at formatted printing and program listing were a bit of a disaster because of my lack of familiarity with the interface controls (if you run in 'NORMAL' mode don't expect to get all the Bee functions – you should run in 'ASCII' mode for these).

For letter and word processor work not requiring special characters and where I want to use a fancy typestyle, I have had some success using the 'NORMAL' mode setting. Just remember to change to 'ASCII' mode on the interface and fit an OCR wheel for listing programs for any work directly related to the ASCII codes.

For economy during preliminary listing or printing work, I use the green-coded fabric typewriter ribbon and its accompanying cover-up correcting ribbon, but for really top-notch presentation-style output (left and right justified and all that), I use the yellow-coded correctible carbon ribbon with its 'yellow' lift-off correcting tape.

Perhaps the most valuable facility available from the Praxis-Bee combination is via the use of the Bee's input and output redirection commands:

In#5 – Allows the full use of the Praxis keyboard to control the Bee – I have not yet found out how to send a reset from the Praxis without resetting the In#5 command. Perhaps the reset disable – but this would not allow recovery from some 'hung' situations.

OUT#5 ON – this command string 'echoes' the screen and will allow you to check what character will be printed by the Praxis when output from the Bee.

It would really be a winner if the Applied Technology Wordbee group could come up with a 'fix' to allow the Praxis to control the Wordbee direct. At the moment, once you call up EDASM from either the Bee or the Praxis keyboard, control is immediately returned to the Bee, which deprives me of a facility I would like to be able to use. There's not much wrong with the Bee keyboard ... but the Praxis is better. Perhaps a reader has a solution.

Conclusions

The combination of the Bee, Wordbee and the Praxis and interface is a very powerful tool. Already I am considering the use of the word processor to help the typing pool at work to understand my terrible handwriting, and I can see the beginnings of Alvin Tofler's 'Third Wave' style of electronic office technology.

My firm makes extensive use of a Hewlett-Packard HP3000 with remote terminals all over Australia, and my next project (after Ron Harris – or whoever – starts selling the network ROMs for the Bee) will be to experiment with linking to my company's system, and to any other system for that matter. With any luck I may not have to travel to work at all in the years to come! □

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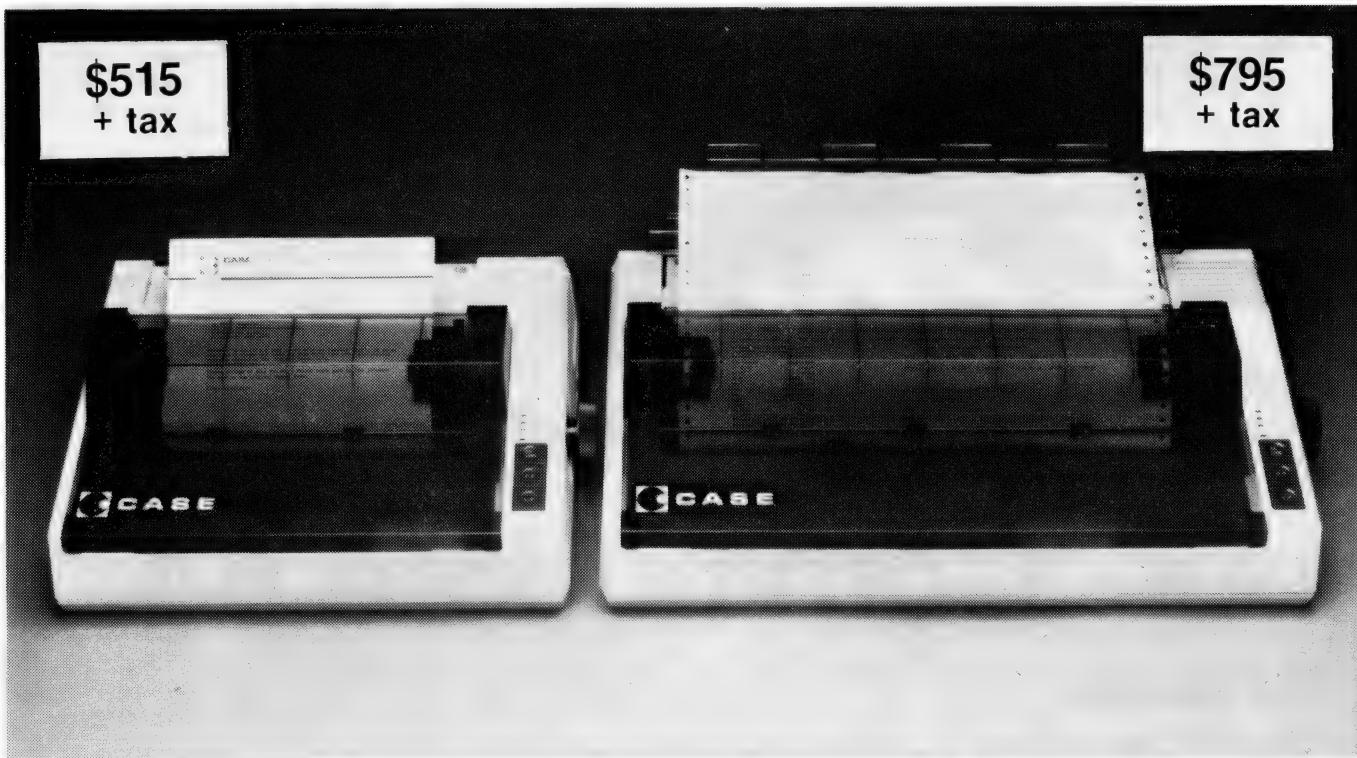
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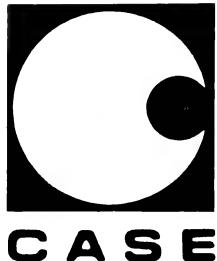
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PRINTER FEATURE

A New Star

Not surprisingly, the Star stx-80 thermal printer is produced by the Japanese firm Star Manufacturing Co Ltd. According to John Nicholls, it is a good example of a compact printer with good features for its size and price.

THERE ARE two versions of this printer, the stx-80 and stx-80T; the only difference appears to be in the fonts used for graphics. The stx-80 provides various lines, patterns, and symbols (like those on playing cards), whereas the stx-80T produces only various combinations of solid blocks in arrangements of squares and rectangles. The version I had for review was the stx-80.

Printers may use one or both of the two types of interfaces, parallel or serial. Parallel interfaces send the data several bits at a time, serial ones only one bit at a time. Because the serial interface is simpler, there are more of them around, but the parallel is faster.

I was told that the Star printer used the Centronics standard parallel interface, and that therefore I could plug it straight into a microcomputer I happened to have on hand which provides such a connection. I greeted this with some scepticism; 100 per cent compatibility is rare in the computer industry, and 98 per cent is of no use of all.

I was delighted to find that my scepticism was unjustified; the printer happily hummed along, printing text I had stored for printing on an Epson printer. When

printing a line it emits only a faint hum; the loudest part of its operation is the line feed. Characters use a 5 by 9 dot matrix, and although some dot matrix printers use a denser matrix, the Star's printing proved perfectly acceptable, with all letters clearly distinguishable from one another. Full descenders are used (on g, j, q and y).

I decided the best way to show the quality of this dot matrix printer would be to print out part of this review using the printer itself. As you can see, the quality would not disgrace many far more expensive printers.

Standard-size 216 mm wide rolls of heat-sensitive paper are used. Eighty characters are printed to a line with standard size print, and 40 with enlarged print. Although it is not mentioned in the user manual, the printer codes used are the same as those used by the Epson. While this may not be significant to those who do not use both printers, any attempt at standardisation deserves praise.

I wasn't able to get the printer to produce full block graphics, but this was the fault of the computer I was using, which did not provide a suitable printer driver. However, the single line I was able to print was of good quality.

The only peculiarity I encountered was with the line feed control. Every time I used it, the printer moved down two lines instead of one. Perhaps one of the internal switches was incorrectly set, or my printer driver wasn't completely compatible.

Step-Down Transformer

The printer I was supplied with was apparently an advance unit, as it ran on 115 volts through a step-down transformer. The specifications indicate that a 240 V version will be available for use in Australia.

The printer started to get a little warm after an hour's operation, with the heat appearing to come from its internal transformer. In common with other manufacturers, no mention is made of a 'duty cycle'. Printers are normally designed to work, say, 15 minutes on and 45 minutes off: a 25 per cent duty cycle, but most manufacturers keep very quiet about this.

The printer User Manual has on its front cover the dreaded word 'preliminary'. This usually carries the implication that the first buyers will be the guinea-pigs to see if the manual is intelligible. The good part of this manual is that it is not written in a fractured English translation.

Having said that, I wasn't impressed with the manual. It has good exploded diagrams of the inside of the printer as well as the outside – should you wish to disassemble it. It also has good clear descriptions of how to insert the paper, use the controls and the self-test print functions.

However, when it comes to the cabling between the printer and the computer the manual goes all astray and gives you the technical details of the Centronics interface ("Signal Pin#10 has a signal with a pulse width of ap-

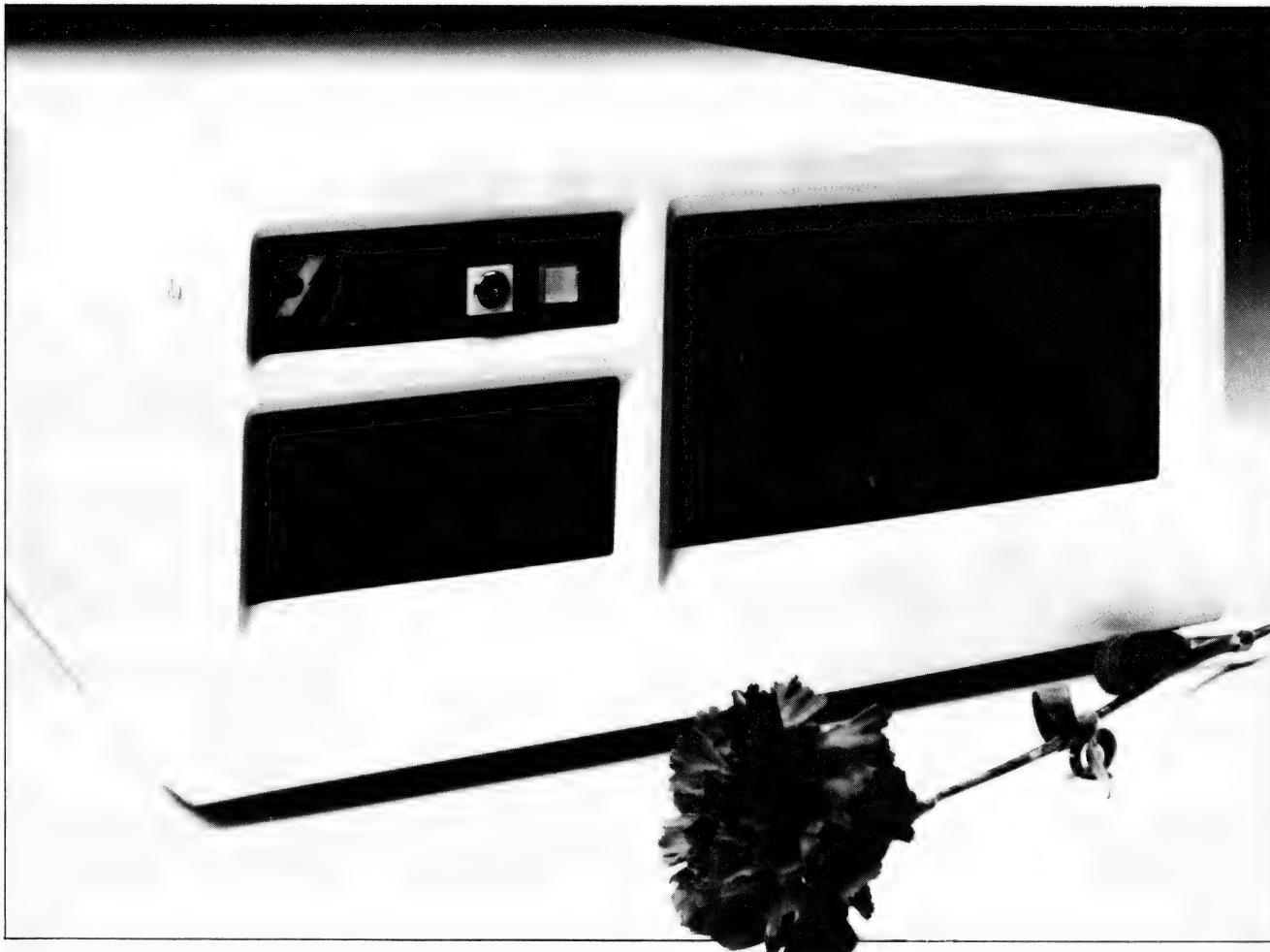
RANGES NUMBER OF POLICIES BY DOLLAR

BRISBANE BRANCH

We decided that the best way to show you the quality of this dot-matrix printer would be to print out part of this review using the printer itself. As you can see, the quality would not disgrace many far more expensive printers.

A slightly enlarged example of the Star stx-80's printing capabilities.

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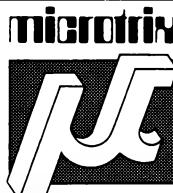
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proximately 8.5 usec)". You could go to most computer shops and ask for a cable with a Centronics parallel interface socket on one end, but who would know what you were talking about if you asked for a "57-30360 (Amphenol product) connecting plug"?

In the same way, although details are provided of each of the control codes, no help is given on how to produce them. In the S0 code (selection of enlarged printing mode), the notes do say: "This function will be cancelled by DC4 or CR code". Whilst this is true, it would be much easier to understand if a further explanation were given that only characters on the same line will be in enlarged mode, and that subsequent lines revert to normal-size characters.

Text is printed bi-directionally. This means that at the end of each line, the printer checks whether it would be quicker to print the next line from the left or from the right. In this mode the print speed is 60 characters a second. Graphics are printed only from left to right, so this operation is slower than text printing.

Good For The Price

The Star stx-80 is compact (352 x 190 x 100 mm), light (3.3 kg) and within its



The Star stx-80 thermal printer — one of the cheapest printers on the market.

limitations appears to work smoothly and well. The main limitations are having to use special paper, being able to use only two print sizes (condensed print would be nice to have) and an unhelpful manual (if you're new to computers a good dealer should be able to

set up the printer without any trouble).

In its price range (it will retail for around \$300 plus tax) the Star stx-80 is a good product. It is distributed in Australia by Case Communications Systems, 1-3 Rodborough Road, Frenchs Forest 2086. (02) 451-6655. □

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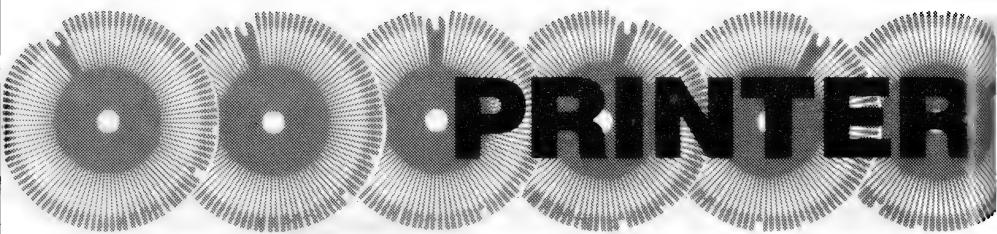
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Mitsui MC2100

The MC2100 from Mitsui is a dot matrix printer designed for use in small business and hobbyist systems. According to Les Bell, it is loaded with features, particularly for its price range.

THE MC2100 is designed to accept standard 9 inch wide (23 cm) sprocket paper, and has an adjustable tractor feed mounted above the platen. However, this can be disabled and the machine used with single sheets of paper, as it has a rubber platen and a roller to hold the paper in place.

At the front of the machine, on the top right side, is the usual control panel, with on-line, form feed and line feed keys, as well as a dual button which allows the user to move the paper up and down to align it exactly. At the right side of the printer is the on/off switch and platen roller.

At the rear of the printer is the power socket and the connectors for data input. The MC2100 has both serial and parallel interfaces as standard, a blessing for those who might upgrade their computer system in the future and find they now have a different kind of printer port.

Under the cover of the printer there's a friction feed changeover lever, which disables the tractor feed, and a lever which adjusts the gap between the printhead and the paper, thereby adjusting the print intensity.

Inside the case, on the printed circuit board at the back, are DIP switches which allow various options to be set. These include the character set (European characters), auto line feeding, page length, select or deselect on power-up, baud rate (2400 max), parity, RS-232 or 20 mA current loop, use of RTS for handshaking and others.

The printer responds to a range of escape sequences which control printing of expanded and condensed characters, line height, underlining, boldfacing and other print attributes.

Simple Graphics

Graphics data can be sent to the printer by setting it into a graphics mode and then sending raw bytes of data, where each bit corresponds to one of the pins in the printhead. The operation in this mode is really quite simple to understand, although the Jinglish manual does rather overcomplicate matters.

I found inserting single sheets to be a rather awkward procedure and it was difficult to get the paper straight. In particular, it was impossible to get paper around the platen in the friction feed position; it had to be turned to tractor feed before the paper would go in correctly.

In addition, a heavier-weight letterhead paper was obviously too stiff for the machine as it rubbed against the ribbon, causing grey marks behind each line of type.

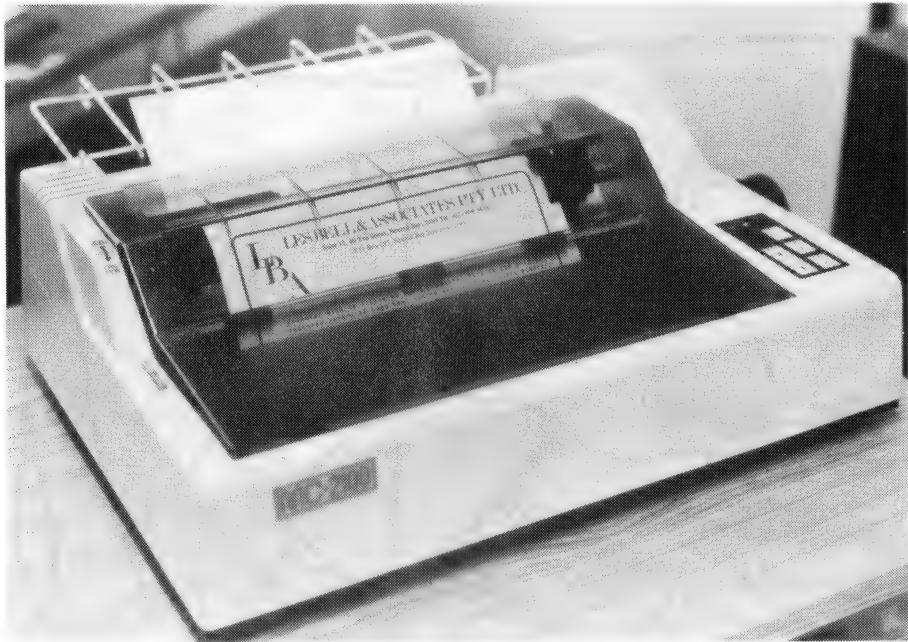
In its draft quality mode, the MC2100 uses a 9 by 7 dot matrix, but in high-quality mode this changes to 17 by 13. This is done by double passes over the line, a procedure which slows the printer considerably.

The MC2100 has a maximum speed of 120 characters per second when printing compressed characters, and it progressively derates with character size and overstriking until it reaches 12 cps when printing expanded letter-quality characters. We tested it on some sample text, and in letter-quality mode it achieved a speed of three minutes per page, which is far from blindingly fast and slightly slower than the rated 24 cps for letter-quality characters.

The MC2100 is priced at \$995.00 including tax, at which price it represents good value. It's a well built machine with the capability to handle many office tasks.

In summary, then, the MC2100 is a good compromise printer for someone who needs both high-speed draft quality and near-letter-quality print from the same machine. It is a very versatile printer, and offers a wide range of features as standard. One should not require any options with this machine. □

FEATURE



Above: The Mitsui MC2100 dot matrix printer.
Below: Draft mode; bottom - near-letter-quality mode.

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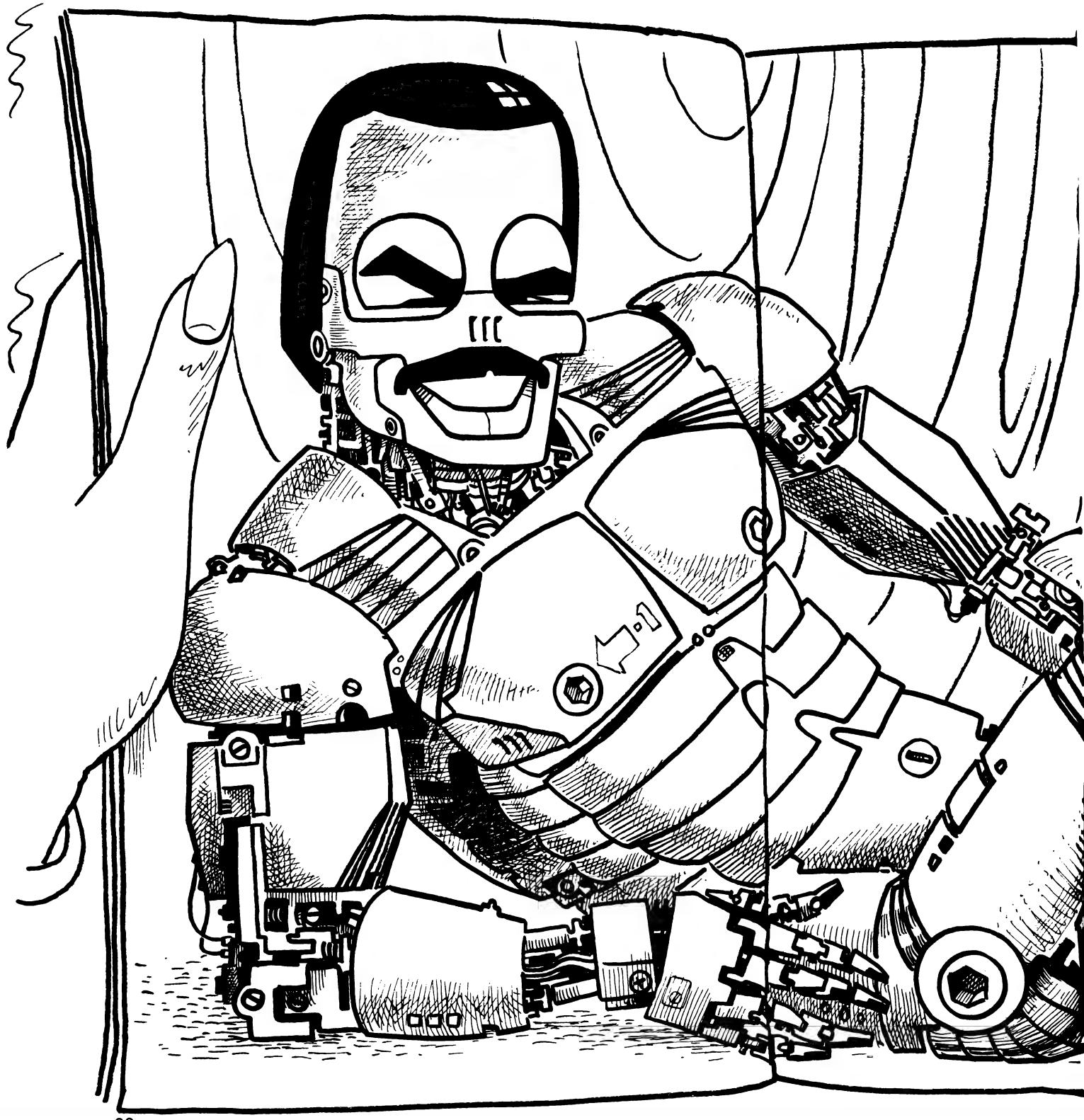
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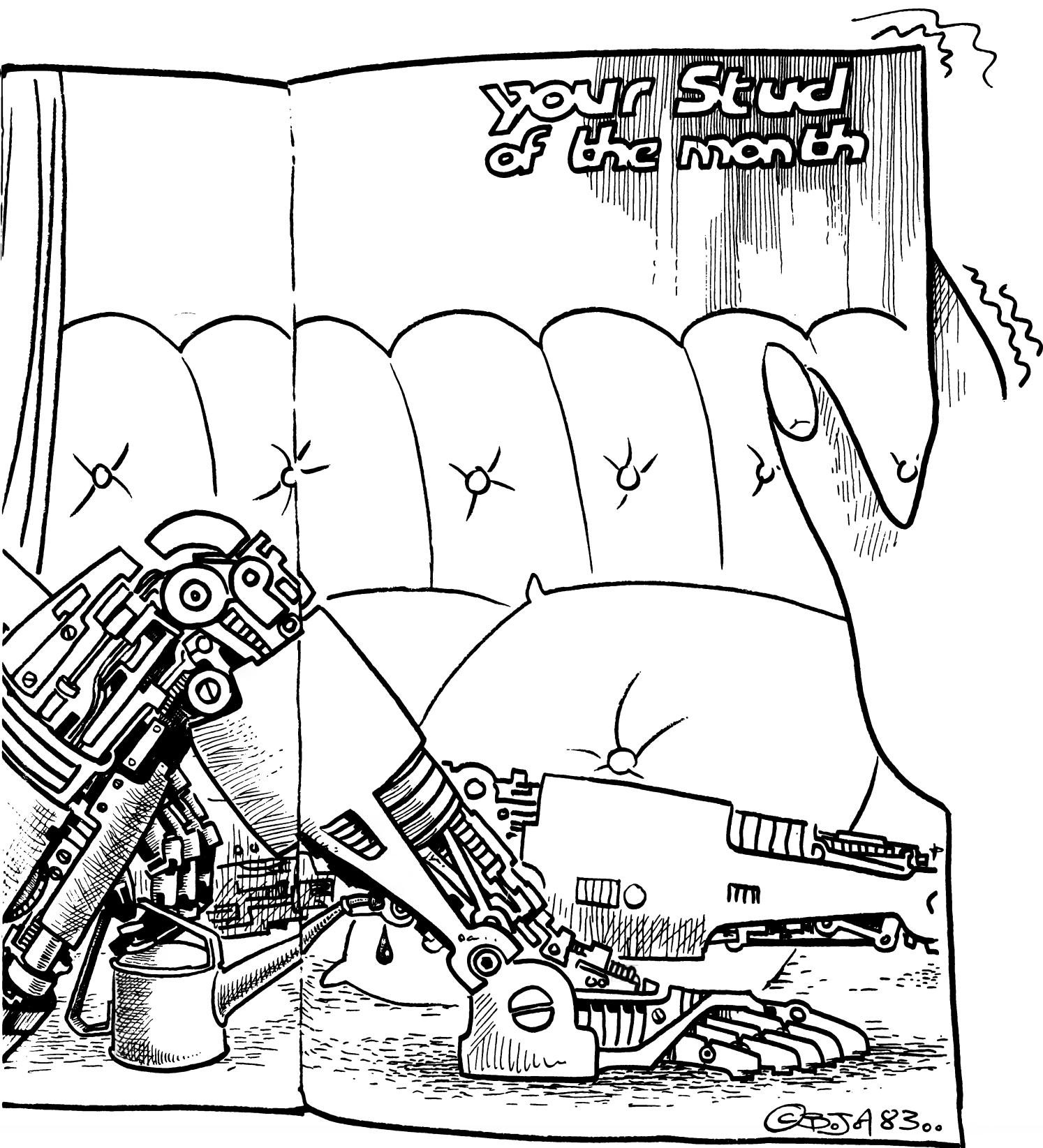
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BASIC-ally Speaking, Burt, Your Days Are Numbered



It's still a noticeable fact that the ratio of female to male computer freaks is minuscule – but growing. Carol Quigley has some words of encouragement for any woman about to take the plunge into the world of bytes, BASIC and hands-on experience.



ACCORDING TO all the computer magazines, everyone is doing it in a kaleidoscope of colours. Megabytes and gigabytes abound. A home computer is a must – along with the microwave oven and video recorder. In a world of futuristic ergonomics, a woman's daily programme has become a program.

Marketing masterpieces from information technology companies, illustrating lovely ladies smiling delightedly at sophisticated workstations, have resulted in user friendly computers rapidly becoming the ultimate hands-on experience since Burt Reynolds. (Only STEP-1 off a robot centrefold perhaps?)

If you threw a party when you learnt to write 1983 as 11110111111, or if you are locked into a Permanent Loop with no way out, don't despair – you're just one of several thousand women captivated by the home computer.

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```
10 INPUT "RATE PER CENT?";R
20 INPUT "TIME IN YEARS?";T
30 INPUT "AMOUNT INVESTED IN
```

your computer



HANDS-ON REVIEW

DOLLARS?"P

```
40 LET I = P*T*R/100
50 PRINT P; "DOLLARS INVESTED
FOR";T;"YEARS AT";R; "PER CENT
PER ANNUM"
60 PRINT "WILL GIVE";I;"DOLLARS"
70 END
```

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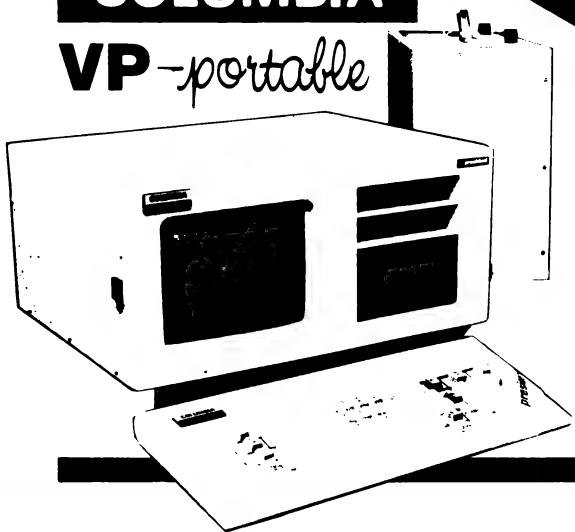
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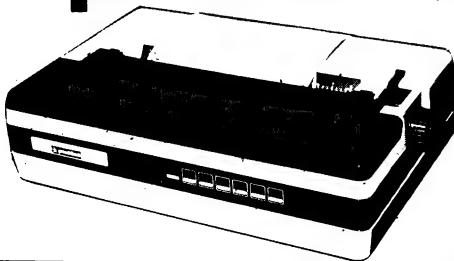


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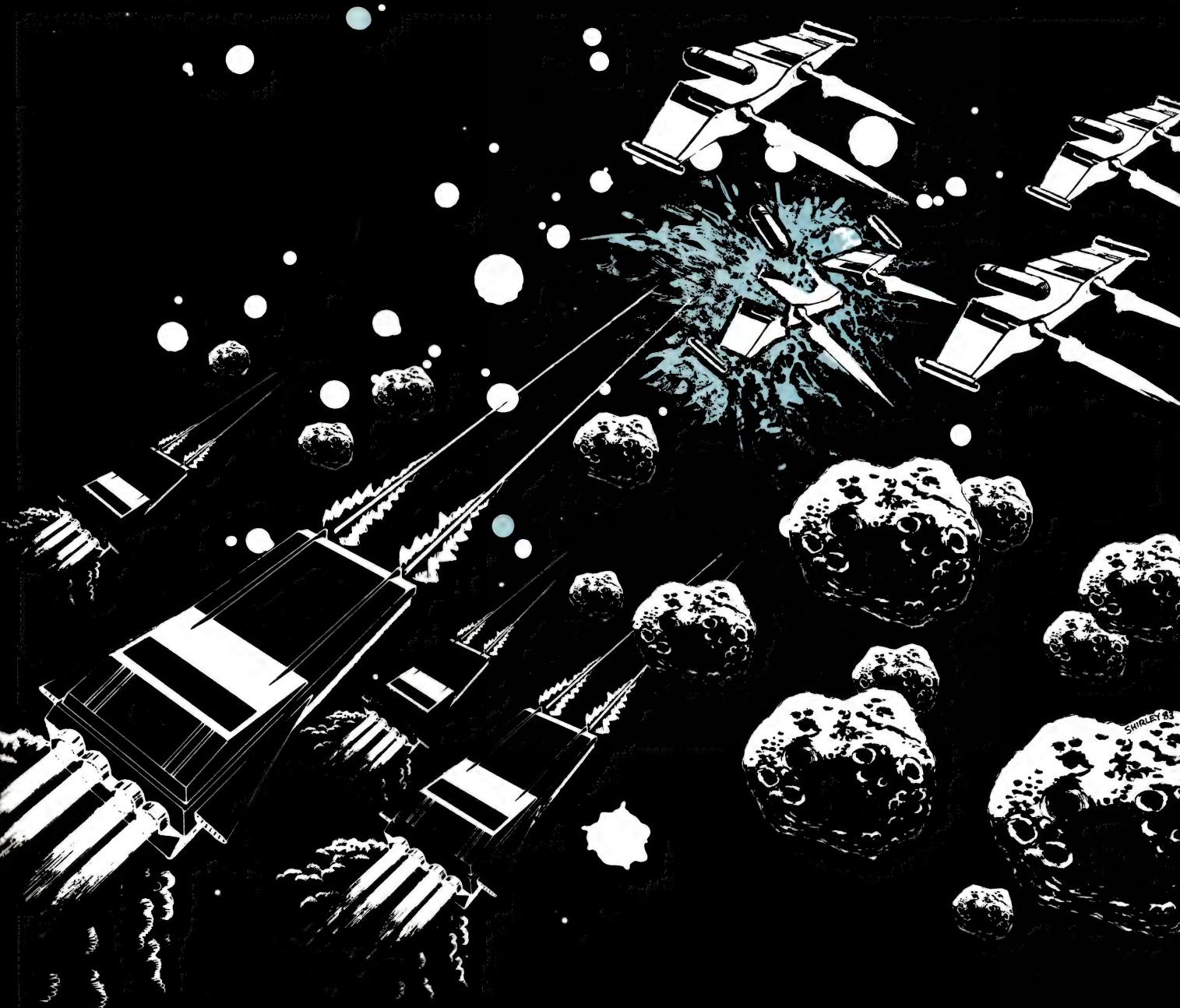
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Time Limit - This is set as a variable (TIME) in line 10. In line 765 it is decremented by 10 per cent.

Number for sums - In lines 320 and 330 random numbers are set for the sums.

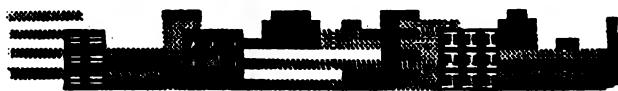
To test one particular table alter the lines as follows:

320 Let x = INT (RND # Q + 1)

330 Let Y = INT (RND # 10 + 1)

(Replace the Q with the number of the table you wish to test).

LASER RANGE
5X4 E7
CONDITION RED



ATOMIC LASER

YOU MUST CALCULATE THE RANGE OF THE LASER NECESSARY TO SHOOT DOWN THE INVADERS.

(BEWARE: THERE IS A TIME LIMIT)

10 REM REFER TO INVADERS.Z80

```

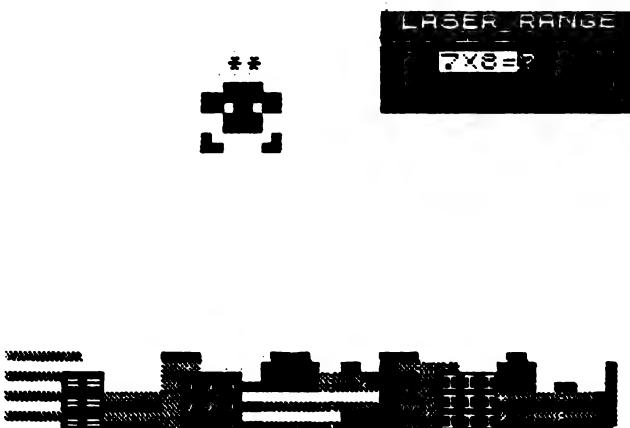
3 FAST
4 GOSUB 4000
5 LET T=0
7 SLOW
8 GOSUB 5000
9 LET K$="" "
10 LET TIME=50
11 LET P=0
12 LET S=(PEEK 16396+256*PEEK
16397)+607
13 LET A=3
14 LET F$="*****-----"
15 LET B=0
16 LET U=100
17 GOSUB 250
30 PRINT AT 1,19;"LASER RANGE"
31 FOR J=1 TO 4
32 PRINT TAB 19;""
33 NEXT J
34 PRINT TAB 19;""
35 NEXT J
36 GOTO 300
100 GOSUB 3000
101 FOR J=1 TO 5
102 PRINT AT A,B;K$
104 FOR D=1 TO 4
105 PRINT TAB B;K$
107 NEXT D
108 LET B=B+2
109 PRINT AT A,B;" >< "

```

```

110 PRINT TAB B+1,Z$(1,2 TO 3)
120 PRINT TAB B,Z$(2)
130 PRINT TAB B+1,Z$(4,2 TO 3)
140 PRINT TAB B,Z$(4,1);";Z$"
(4,4),
196 NEXT J
200 RETURN
250 PRINT AT 18,0;
260 PRINT " "
270 PRINT " "
280 PRINT " "
290 PRINT " "
295 RETURN
300 LET AN=0
320 LET X=INT (RND*5+5)
330 LET Y=INT (RND*7+3)
340 LET Z=X*Y
350 GOSUB U
380 PRINT AT 3,22;X;"X";Y;"=""
400 FOR J=1 TO TIME
401 IF INKEY$<>"" THEN GOTO 409
402 PRINT AT A,B;K$
404 PRINT AT A,B;" **"
405 IF INKEY$<>"" THEN GOTO 409
407 NEXT J
408 GOTO 1000
409 IF LEN STR$ Z=1 THEN GOTO 4
80
410 LET A$=INKEY$
415 PRINT AT 3,26;A$
419 IF INKEY$<>"" THEN GOTO 419
420 IF INKEY$="" THEN GOTO 420
430 LET B$=INKEY$
470 LET A$=A$+B$
480 LET AN=VAL A$
490 PRINT AT 3,26;A$
500 GOSUB 700
710 FOR J=1 TO 13
715 LET S=S-33
720 POKE S,27
725 IF J=5 AND AN>Z THEN GOTO
1000
730 NEXT J
735 GOSUB 200
740 LET P=P+1
750 PRINT AT 6,19;"INVADERS"
752 PRINT AT 7,19;"DESTROYED =" P
755 FOR J=1 TO 20
756 NEXT J
759 CLS
765 LET TIME=TIME*.9

```



```

770 GOTO 12
900 IF NOT AN THEN RETURN
903 LET D#=F$(RD TO RD+4)
904 PRINT AT A,B,
905 FOR N=1 TO 5
907 PRINT TAB B,D#
910 NEXT N
950 RETURN
1000 FOR J=1 TO 10
1001 PRINT AT 4,19; "CONDITION RE
D"; AT 4,19; "CONDITION RED"
1002 NEXT J
1004 LET A=A+5
1005 GO SUB 900
1008 LET S=(PEEK 16396+256*PEEK
16397)+178
1010 IF PEEK (S)=118 THEN STOP
1020 FOR J=A-1 TO 16
1025 PRINT AT J,B+1;" "; AT J,B+2
1040 NEXT J
1050 FAST
1055 CLS
1060 FOR J=1 TO 10
1070 PAUSE 2
1080 NEXT J
1100 SLOW
1105 IF NOT AN THEN PRINT AT 3,0
;"YOU WERE NOT QUITE ENOUGH."
1110 PRINT AT 5,3; "THE CITY HAS
SEEN DESTROYED."
1120 PRINT ",N$; "/S SCORE=";P
1125 IF P>T THEN LET T=P
1130 PRINT ,,"TOP SCORE THIS S
ESSION=";T
1140 PRINT AT 20,0; "PRESS ENTER
FOR RESET."
1150 INPUT A$
1155 CLS
1160 GOTO 8
3000 LET RD=(INT (RND*5))*5+1
3001 DIM Z$(4,4)
3002 FOR J=1 TO 4
3005 LET RD=(INT (RND*5))*5+1
3010 LET Z$(J)=Q$(RD TO RD+3)
3015 NEXT J
3020 RETURN
4000 REM INCLUDE INSTRUCTIONS
4001 LET Q$=""
4003 FOR I=1 TO 5
4004 FOR K=1 TO 2
4005 LET A1=INT (RND*10+126)
4010 LET B1=A1
4031 IF A1=135 THEN LET B1=4
4035 IF A1=134 THEN LET B1=6
4036 IF A1=133 THEN LET B1=5

```

```

4040 IF A1=132 THEN LET B1=7
4044 IF A1=130 THEN LET B1=129
4045 IF A1=129 THEN LET B1=130
4046 IF K=2 THEN GOTO 4055
4050 LET FF=A1
4052 LET GG=B1
4055 LET HH=A1
4060 LET II=B1
4075 NEXT K
4080 LET N$=CHR$ FF+CHR$ HH+CHR$
II+CHR$ GG
4090 LET Q$=Q$+N$+" "
4091 NEXT I
4095 RETURN
4099 STOP
5000 PRINT AT 7,0; "STOMMIC LASERS"
5010 PRINT ,,"YOU MUST CALCULATE
THE RANGE", "OF THE LASER NECESS
ARY TO ", "SHOOT DOWN THE INVADER
S."
5015 PRINT ,,"(BEWARE: THERE IS
A TIME LIMIT)"
5020 PRINT ,,"TYPE IN YOUR FIRST
NAME THEN PRESS ENTER...."
5030 INPUT N$
5040 CLS
5045 RETURN
5049 STOP
5050 CLEAR
9001 SAVE "LASER"
9002 RUN

```

Shark Bait for ZX80.

By Paul Vandenberg,
Cabrannatta NSW

The idea of this game is to catch fish without getting caught by the fishermen's hooks ('J'). The fish are light-coloured squares; your shark is a dark-coloured square. You must try to catch fish by guessing where any of the fish will be next, using the scale below it. The

fish never move more than three places left or right from where they were before. Both the fish and the hooks move randomly.

Variables:

H(3): Position of three hooks
F(1-3): Position of three fish
SS = CHR\$(128) = Black square for shark
S = Position of shark
SC = Score
SL = Sharks left

SHARK BAIT

```

1 DIM H(3)
3DIM F(3)
5 FOR F=1 TO 3
6 LET H(F)=RND(30)
7 LET F(F)=RND(30)
8 NEXT F
9 LET H$="J"
10 LET SS=CHR$(128)
11 LET S=RND(30)
12 LET SL=9
13 LET SC=0
29 CLS
30 PRINT "SHARK BAIT", "SHARKS LEFT=";SL; " SCORE=";SC
34 PRINT
35 FOR F=1 TO 30
36 IF H(1)=F OR H(2)=F OR H(3)=F THEN PRINT H$;
37 IF NOT H(1)=F OR NOT H(2)=F OR NOT H(3)=F THEN PRINT " ";
38 NEXT F
39 PRINT
40 FOR F=1 TO 30
41 IF S=F THEN PRINT SS;
42 IF NOT S=F THEN PRINT " ";
43 NEXT F
44 PRINT
45 FOR F=1 TO 30
50 IF F(1)=F OR F(2)=F OR F(3)=F THEN PRINT CHR$(9);
51 IF NOT F(1)=F OR NOT F(2)=F OR NOT F(3)=F THEN PRINT " ";
52 NEXT F

```

```

53 PRINT
54 PRINT"00000000111111112222222223"
55 PRINT"123456789012345678901234567890"
60 IF S=H(1) OR S=H(2) OR S=H(3) THEN GOTO 100
61 IF S=F(1) OR S=F(2) OR S=F(3) THEN GOTO 200
62 INPUT G
63 LET S=G
64 FOR F=1 TO 3
65 LET H(F)=H(F)+RND(6)-3
66 LET F(F)=F(F)+RND(6)-3
67 IF H(F)<0 THEN LET H(F)=H(F)+RND(10)
68 IF F(F)<0 THEN LET F(F)=F(F)+RND(10)
69 IF H(F)>30 THEN LET H(F)=H(F)-RND(10)
70 IF F(F)>30 THEN LET F(F)=F(F)-RND(10)
73 NEXT F
79 GOTO 29
100 SL=SL-1      101 IF SL=-1 THEN GOTO 300
102 GOTO 62
200 LET SC=SC+5
201 GOTO 62
300 CLS
301 PRINT"YOU GOT A SCORE OF ";SC;"=";SC/5;" FISH."

```

MICROBEE

Typing Tutor for Microbee.

By David Morrison,
East Ringwood VIC

Most computer users would benefit by being able to type faster. This program, which will run on a 16K or 32K Microbee,

could increase your typing speed. Although the program is not very long it possesses a lot of features usually found in expensive typing tutorial programs.

```

0010 REM***Typing exercise program
00100 DIM T(128)
00105 REM**Data for PCG characters: ( and )
00110 DATA $,63,32,32,32,32,32,32,32,32,32,32,32,32,63
00120 DATA $,252,4,4,4,4,4,4,4,4,4,4,4,4,4,252
00130 REM**Keyboard offset table data
00140 DATA $,0,0,0,0,0,0,0,157,52,75,114,0,0,120,0,0,0,0,0,0,0
00150 DATA 13,16,19,22,25,28,31,34,37,43,170,229,46,232,235,40,
13,16,19,22,25,28,31,34,37,43,170,229,46,232,235,173
00160 DATA 143,220,214,149,84,152,155,158,99,161,164,167,226,223
,162,165,78,87,146,90,96,217,81,211,93,208
00170 DATA 108,176,111,49,179,173,143,229,214,149,84,152,155,158
,99,161,164,167,226,223,162,165,78,87,146,90,96,217,
81,211,93,208,108,176,111,49,179
00180 CLS:OVERLINE
00185 REM**Overline PCG characters
00190 FOR I=63489 TO 65521 STEP 16:POKE I,255:NEXT I
00195 REM**Store PCG characters: ( and )
00200 FOR I=64128 TO 64159:READ A:POKE I,A:NEXT I
00205 REM**Read keyboard offset array
00210 FOR I=0 TO 127:READ T(I):NEXT I
00215 REM**Display keyboard
00220 CURS 8,1:PRINT"(ESC)(1)(2)(3)(4)(5)(6)(7)(8)(9)(0)(:)(";
00230 PRINT"-)(^)(~)(BS )"
00240 CURS 9,2:PRINT"(TAB)(Q)(W)(E)(R)(T)(Y)(U)(I)(O)(P)(L)(";
00250 PRINT")"(LF)(RET)"
00260 CURS 7,3:PRINT"(CT)(LK)(A)(S)(D)(F)(G)(H)(J)(K)(L)(:)(";
00270 PRINT")"(DEL)(BK")"
00280 CURS 11,4:PRINT"(SFT)(Z)(X)(C)(V)(B)(N)(M)(.,)(.)(/)( S";
00290 PRINT"FT )(RES)"
00300 CURS 20,5:PRINT"(          SPACE BAR          )"
00310 NORMAL
00315 REM**Set block cursor
00320 POKE 220,1
00325 REM**Initialize speed
00330 CURS 832:INPUT"STARTING SPEED ?":S:M=S
00335 REM**Get ASCII number and set keyboard cursor
00340 R=INT(RND*43)+48:POKE 62112,R
00350 CURS (R):PRINT CHR$(9);
00355 REM**Time input and check if correct
00360 C=S

```

```

00370 C=C-1:A1$=KEY$:IF A1$="" AND C<>0 THEN 370
00380 CURS 900:PRINT S;" MIN=";M;" ";
00390 IF C<>0 OR ASC(A1$)<>R THEN PLAY 23:S=S+2:GOTO 350
00400 S=S-1
00410 IF S<M THEN LET M=S
00420 GOTO 340
00430 END

```

Bee-clock for Microbee.

By Bernard Wansbrough,
Perth WA

BEE-CLOCK is a program where the computer will accurately measure time until you push BREAK, RESET or cut the power. Over the changing of the

hour (less so with minutes) the program can lose a small fraction of time. If you wish to alter the speed of the clock, change the value in 170 up from the normal 362 to slow it down, and lower the value to speed it up.

```

88010 REM***BEE CLOCK By Bernie Wansbrough April 1, 1983**
88020 CLS
88030 INPUT"ENTER HOURS, MINUTES, AND SECONDS SEPARATED BY COMMAS.(HH,MM,SS)" ;H,
M,S
88040 IF H>12 OR M>59 OR S>59 THEN PRINT"INVALID ENTRY...TRY AGAIN. HOURS MUST BE
12 OR LESS, MINUTES AND SECONDS MUST BE 59 OR LESS.":GOTO 30
88050 PRINT"DO YOU WANT A BEEP FOR EVERY SECOND (Y/N) "
88060 A1$=KEY$:IF A1$="Y"THEN 60
88070 IF A1$="N" THEN LET P=0:GOTO 90
88080 P=1
88090 CLS
88100 GOTO 120
88110 H=81:M=8:S=8
88120 CURS 30,7:PRINT H ":"M ":"S
88130 X=0
88140 IF S=48 THEN LET M=M+1:S=0:CLS:GOTO 120
88150 IF M=60 THEN LET H=H+1:M=0:CLS:GOTO 120
88160 IF H>13 THEN CLS:GOTO 110
88170 FOR I=1 TO 362:NEXT I:PLAY P:S=8+1:GOTO 120

```

Easter Sunday for Microbee.

By R Watkins,
Glenbrook NSW

This program calculates Easter Sunday from 325 AD when the first Sunday after the first full moon after the spring equinox (northern hemisphere) was fixed as Easter.

Lines 330 and 490 adjust for the change from the British calendar to the Gregorian one in 1752.

Helpful hints to translate into other computers are:

Spc = Space – use 'tab' as alternative.

Fract = Fraction – the part after decimal.

Elit = Floating – converts integers into real numbers. May be left out if your computer supports integer and real expressions in the same expression.

Play = Sound – make up your own music.

```

00100 REM *** 'EASTER SUNDAY' for MICROBEE ****
00110 REM *** By R.Watkins .BLUE MOUNTAINS NSW ****
00120 REM *** BLUE MOUNTAINS COMPUTER CLUB ****
00130 REM *** Algorithme by astronoeer LILIUS and ****
00140 REM *** mathematician CLAVIUS in 16th century **
00150 REM *** and modified by REV. C BLOUNT (UK) ****
00160 CLS:PRINT:PRINT: Q=9
00170 PRINT SPC(Q) "YEAR FOR WHICH EASTER IS REQUIRED";
00180 INPUT V1:PRINT
00190 V2=FRACT(V1):IF V2<.05 THEN 210
00200 PRINT SPC(Q) "SORRY, BUT THE YEAR MUST BE WHOLE NUMBER":GOTO 170
00210 IF V1>325 THEN 240
00220 PRINT SPC(Q) "SORRY, BUT THE YEAR MUST BE GREATER THAN 325 AD"
00230 GOTO 170
00240 V3=Y1
00250 IF V3<19 THEN 270
00260 V3=Y3-19: GOTO 250
00270 V3=Y3+1
00280 Y4=FLT(INT(Y1/100)+1)
00290 Y5=FLT(INT(Y4*43/4)-12)
00300 Y6=FLT(INT((84*Y4+5)/25)-5)
00310 Y7=FLT(INT((5*Y1/4)-Y5-10))
00320 A1=FLT(INT(11*Y3+28+Y6-Y5))
00330 IF Y1<1753 THEN LET A1=A1+8
00340 IF A1<0 THEN LET A1=A1+360
00350 IF A1<30 THEN 380
00360 A1=A1-30
00370 GOTO 350
00380 IF A1=24 THEN 410
00390 IF A1=25 AND Y3>11 THEN 410
00400 GOTO 420
00410 A1=A1+1
00420 D1=44-A1

```

MICROBEE

```

00430 IF D1<21 THEN LET D1=D1+30
00440 B1=Y7+D1
00450 IF B1<7 THEN 400
00460 B1=B1-7
00470 GOTO 450
00480 D1=D1+7-B1
00490 IF Y1<1753 THEN LET D1=D1+3
00500 IF D1>31 THEN 540
00510 CLS: PRINT: PRINT
00520 PRINT SPC(0) "EASTER SUNDAY IS MARCH, ";INT(D1+.05);";";Y1
00530 GOTO 560
00540 CLS: PRINT: PRINT
00550 PRINT SPC(0) "EASTER SUNDAY IS APRIL, ";INT(D1-31+.05);";";Y1
00560 PRINT: PRINT
00570 PRINT SPC(0) "DO YOU WANT TO CHECK ANOTHER DATE? "
00580 PRINT SPC(0) "IF SO, ENTER Y (<YES>) OR N (<NO>) "
00590 INPUT P1$
00600 IF P1$="Y" OR P1$="y" THEN 160
00610 IF P1$="N" OR P1$="n" THEN 630:GOTO 570
00620
00630 PRINT:PRINT SPC(0) "BYE, BYE":PLAY 18:14:10:6:2
00640 END

```

TANDY TRS/80 SYSTEM 80

Surround for TRS-80 Model 1 Level 2.

By Kim Henkel,
East Bentleigh VIC

SURROUND is a real time arcade game for two players. It is based on the Atari game of the same name.

The program uses an INKEY

routine to control each player's lengthening line. The object of the game is to steer your line around the screen, avoiding yourself, the walls, and the other player. A point is gained by the other player if you hit any of these.

```

0 REM -----
1 REM *          S U R R O U N D      *
2 REM *          K I M H E N K E L   1 9 8 3  *
3 REM *          -----
4 REM *          -----
5 REM -----
10 CLS:GOSUB700
20 N=5 : ' * N = NUMBER OF POINTS PER GAME * *
80 CLS1$=RND(4): ' * RANDOM STARTING DIRECTION *
85 IFS1=THENL$="A":IRS1="J":GOTO110
90 IFS2=THENL$="D":IRS2="L":GOTO110
95 IFS3=THENL$="E":IRS3="I":GOTO110
100 L$="C":IRS4="N"
110 XL=15:YL=24:XR=113:YR=24:
115 FORX=0TO127:SET(X,0):SET(X,47):NEXT
120 FORY=0TO47:SET(0,Y):SET(1,Y):SET(126,Y):SET(127,Y):NEXT
122 IFT=1THENI$=ELSE200
124 I$=INKEY$:IFI$=""THENI$=R$
125 IF ASC(I$) (70THEN200
126 R$=I$
130 IFI$="J":THENXR=XR-1:GOTO140
132 IFI$="L":THENXR=XR+1:GOTO140
134 IFI$="I":THENYR=YR-1:GOTO140
136 IFI$="N":THENYR=YR+1
140 IFPOINT(XR,YR) () @THEN300
145 SET(XR,YR):T:=2:GOTO122
200 I$=INKEY$:IFI$=""THENI$=L$
205 IFASC(I$) 70THEN130
210 L$=I$
215 IFI$="A":THENXL=XL-1:GOTO225
217 IFI$="D":THENXL=XL+1:GOTO225
219 IFI$="C":THENYL=YL-1:GOTO225
221 IFI$="E":THENYL=YL+1
225 IFPOINT(XL,YL) () @THEN400
230 SET(XL,YL):T:=1:GOTO122
300 FORF=1TO70:SET(XR,YR):RESET(XR,YR):X=USR(400):NEXT
305 L$=+1:CLS:PRINT:PRINTTAB(20)LP$;" WON THAT POINT":GOTO500
400 FORF=1TO70:SET(XL,YL):RESET(XL,YL):X=USR(700):NEXT
405 R=R+1:CLS:PRINT:PRINTTAB(20)RP$;" WON THAT POINT":GOTO500

```

```

500 PRINT:PRINT:PRINTSTRING$(64,140):PRINTTAB(22):" T O T A
L":PRINTSTRING$(64,131)
505 PRINT:PRINT:PRINTTAB(22)LP$;" HAS WON ":"R
510 NG=NG+NTHEN580
520 FORF=1TO1000:NEXT:Z=100:GOTOB0
530 FORF=1TO4:PRINT:FORFF=1TO100:NEXT:NEXT
560 PRINTTAB(22):" G A M E O V E R "
565 FORF=2TO70:STEP10:FORFF=1TO30:X=USR(256+F):NEXTFF,F
610 END
700 CLS
701 REM * SOUND ROUTINE - NEEDS NO (MEM-SIZE) SETTING *
702 FORS=16446 TO 16474:READD:POKE,D:NEXT:POKE16526,62:POKE1652
7,64:DATA205,127,10,62,1,14,0,237,91,61,64,69,47,230,3,179,211,2
55,13,40,4,16,246,24,242,37,32,241,201
704 PRINTCHR$(23)
705 H=15822
706 READH:I=FHH=0THEN745ELSEIFHH=-1THEN748
708 POKEH,HH:H=H+A:FORF=1TO80:NEXT:F=GOT0705
710 DATA 83,117,114,114,111,117,110,100,0
745 FORF=100TO1STEP-2:FFF=FF+1:X=USR(256+FF):NEXT
746 DATA128,128,128,128,128,128,128,-1
747 GOT0705
748 CLS:X=USR(260)
750 INPUT" LEFT PLAYER, PLEASE ENTER YOUR NAME...":LP$
753 X=USR(280)
755 INPUT" RIGHT PLAYER, PLEASE ENTER YOUR NAME...":RP$
760 PRINT:PRINT:PRINTTAB(18):LP$:TAB(58):RP$
765 PRINT:PRINTTAB(20):"E":TAB(40):"I"
770 PRINTTAB(17):"A":D":TAB(37):"J":L"
775 PRINTTAB(20):"C":TAB(40):"N"
776 PRINT:PRINT:PRINTTAB(20):"PRESS ANY KEY TO PLAY"
777 A$=INKEY$:IF A$="":THEN777
780 X=USR(300):RETURN

```

Supertrek for Super 80.

By George Georgiou,
Kensington NSW

Supertrek will work on any shape or size Super 80. Because Super 80 BASIC is similar to the Microbee's, Microbee owners can type it in directly with the exception of the OUT statements. These can be ignored as they aren't very important.

The game is played similarly to the traditional Star Trek games on other micros. The object is to destroy all the Klingons on the limited amount of energy you have. You can only receive extra fuel if you dock with a Starbase.

There are six commands:

1. Move in sector
2. Fire phasers
3. Warp away

4. Maintain status
5. Dock with starbase
6. Self destruct

When you fire phasers you are required to enter the vertical and horizontal co-ordinates. Then you enter how much energy you wish to devote to that shot. For a sensible result enter an amount between 250-450.

When you are damaged beyond repair and cannot do anything you can only maintain status.

Warp away to another sector when there are no Klingons on your scanner.

Symbols:
E: enterprise
*: star
K: Klingon ship
B: star base
Live long and prosper!

```

00001REM Super Trek By G.Georgiou
00002CLS:PRINTCA31 421:CURS448:PRINT[A31 42]
00010CURS73:PRINT" SUPER TREK"
00011CURS105:PRINT" -----"
00012G=0
00015FORX=1TO500:NEXTX
00020CURS256:PRINT"PLEASE ENTER YOUR NAME IN THE"
00021INPUT"CAPTAINS LOG.    ">S1$ 
00030V=0
00120OUT240,251
00121D=0:K=INT(RND*20)+5:IFK(12THEN121
00130DIM(A(65)):P=K#75
00131G=0
00150OUT240,251:FORI=1TO50:A(I)=0
00160X=INT(RND*15)
00170IF X=3 THENLETA(I)=3
00180IF X=7 THENLETA(I)=7
00190NEXTI
00195W=INT(RND*100):IFW>70THENLETG=1:0=1
00210X=INT(RND*25):A(X)=2:A(25)=1:L=25
00220OUT240,255
00230CLS:I=0:J=0:X=1:E=0
00231IFK(1THENGOT2000
002335IFK(8THENGOTSUB3000
00240PRINT" -----"
00250PRINTX;"! "
00260I=1:I
00270IFA(I)=0THENPRINT" ",:GOT0320
00280IFA(I)=1THENPRINT"E":,GOT0320
00290IFA(I)=2THENPRINT" ",:GOT0320

```

TANDY TRS/80 SYSTEM 80

```

00291(FW)7OTHENGOSUB1600
00300IFA(1)=3THENPRINT";:GOTO320
00310IFA(!)=7THONSUB2300
00320J=X!;IFJ&THENGOT0340
00330GOTD260
00340X=X!;J=0
00350IFX=2THENPRINT" ! POWER LEVEL=";P
00360IFX=3THENPRINT" ! KLINGONS LEFT";K
00370IFX=4THENPRINT" ! OPTIONS"
00380IFX=5THENPRINT" ! 1 MOVE IN SECTOR"
00390IFX=6THENPRINT" ! 2 FIRE PHASERS"
00400IFX=7THENPRINT" ! 3 WARP AWAY"
00410IFX(8THENGOT0250
00420PRINT" ! 4 MAINTAIN STATUS"
00430PRINT" ----- 5 DOCK STARBASE"
00440PRINT" 1234567 6 SELF DESTRUCT"
00450CURS20:PRINT"COMMAND":INPUTD
00451IF(D)6)OR(D(=0)THENGOT0450
00460ONDGOTD,690,740,490,880,1200,1800
00490IFP(<400THENCURS20:PRINT"ENERGY TOO LOW!")
00491IFP(<400THENFORT=1TO500:NEXTJ:GOTD450
00500REM WARPING
00510CLS:CURS261
00520PRINT"[ENGAGING WARP ENGINES]"
00521OUT240,6
00530FORX=1TO500:NEXTJ:CLS
00539J:DRH=1TD35
00540B=INT(RND*510):CURSS:PRINT"."
00543B=INT(RND*510):CURSS:PRINT"."
00545B=INT(RND*510):CURSS:PRINT"."
00550B=INT(RND*511):CURSS:PRINT"."
00551CURBSII
00555PRINT
0057ONEXTH
00580OUT240,255
00600P=P+200
00670GOTD0150
00690GOTSUB850
00700IFA(M)=0 THEN LET A(L)=0:A(M)=1:L=M:P=P-100:N=1:GOTD890
00710PRINT" CAPTAIN "S1*
00711PRINT" ENSIGN CHEKOV REPORTS."
00712PRINT
00715PRINT" INCORRECT COURSE DATA SIR!"
00720FORJ=1TO500:NEXTJ:GOTD230
00740IFQ=3THENCURS20:PRINT"PHASER BANKS INOPERATIVE",FORX=1TD500:NEXTX.
00741IFQ=3THENCURS20:PRINT" :GOTD450
00742CURS20:PRINT"ENERGY TO FIRE":INPUTE:P=P-E
00744GOTSUB850
00745B=INT(RND*275)+100:IFE(6THENCLS:PRINT"CAPTAIN ";B1*:PRINT
00746IFE(6THENPRINT"SENSORS INDICATE KLINCON":PRINT
00747IFE(6THENPRINT"RAFT SURVIVED ENTERPRISES FIRE"
00748IFE(6THENFORX=1TO800:NEXTR
00749IFE(6THENGOTD890
00750IFA(M)=7THENLETA(M)=0:K=K-1:PRINT" *** KLINGON DESTROYED ***"
00755IFK(1THENFORJ=1TO500:NEXTJ
00760IFK(1THENGOTD5000
00770FORJ=1TO500:NEXTJ
00790N=1
00830GOTD890
00830CURS20:PRINT"INPUT VERTICAL ":INPUTY
00851IF(Y)>0:DRY(1THENGOTD850
00860CURS20:PRINT"INPUT HORIZONTAL":INPUTX
00861IF(X>1)ORX>1)THENGOTD860
00870Y=Y-1:M=7*Y+X:IFD=5THENRETURN
00871FLS:RETURN
00880REM
00890X=INT(RND*32):IFX(210R(X=0)THENGOTD1020
00900CLS:PRINT" CAPTAIN ";S1*:PRINT
00905=INT(RND*280)+120
00910PRINT"SENSORS INDICATE";F;" UNIT HIT ON"
00913PRINT"ENTERPRISE FROM KLINCON VESSEL":P=F-F
00914IFK(8THENPRINT" HIT 'MAY' HINDER COMPUTERS"
00915IFK(8THENPRINT"ACCURACY"
00920PRINT"IF(P)=1800)THEN PRINT" NO DAMAGE":GOTD1000
00930PRINT"INAG:REFURTS COMING IN...."
00940IF(P>2000)PRINT" NO INJURIES":GOTD1000
00950IF(P>2000)THENPRINT" SEVERAL CREWMAN INJURED"
00960IF(P>1000)THENPRINT" DAMAGE TO ANTIMATTER POD"
00970IF(P>800)THENPRINT" POD JETTI:SIGNED"
00980IF(P>400)THENPRINT" PHASER BANKS INOPERATIVE"
00990IF(P>200)THENPRINT" SHIELDS DAMAGED"
01000FORI=1TO1000:NEXTI:PRINT
01020CLS:PRINT" ENGINEERING REPORT":PRINT
01030IFP>2000THENPRINT" ALL SYSTEMS FUNCTIONING"
01040IFP(<2000)THENPRINT" NON-ESSNTIAL SYSTEMS SHUT DOWN"
01050IFP(1400)THENPRINT" SHIELDS HOLDING"
01060IFP(100)THENPRINT" LIFE SUPPORT SYSTEMS CUT BACK"
01061D=600
01070IFP(<500)THENPRINT" PHASER BANKS INOPERATIVE"
01071IFP(500)THENLETG=3
01080:FF(400)THENPRINT" ONLY IMPULSE POWER AVAILABLE"
01090IFP(300)THENPRINT" SHIELDS STARTING TO FAIL"
01100FORI=1TO1000:NEXTI
01120IFP>100THENGOTD230
01121IFK(1THENIDT(1000
01125GOTD1800
01130GOTD5100
01200IFG=1THENGOTD1500
01201PRINT
01202CLS
01205PRINT" CAPTAIN ";S1*
01206PRINT
01210PRINT" OBVIOUSLY LOGIC TELIS"
01211PRINT

```

```

01220PRINT"US THAT IF NO STARBASE IS ON"
01221PRINT
01230PRINT"OUR SCANNERS WE ARE OUT OF RANGE"
01231PRINT
01240PRINT"ONE WOULD OF THOUGHT THAT EVEN"
01241PRINT
01250PRINT"A HOMOSAPIEN MIND COULD AT LEAST"
01251PRINT
01260PRINT"REASON CORRECTLY!""
01270FORY=1TO3000:NEXTY:GOTD230
01500CLS:PRINT" STANDBY FOR DOCKING ENTERPRISE"
01509FORU=1TO500:NEXTU
01510FORZ=1TO100:STEP-1
01511FORZ=239:PRINTZ:FORQ=1TO100:NEXTQ:CURS239:PRINT"      :NEXTZ
01520LURZ=26:PRINT" DOCKING (COMPL TEJ)":CURS510:PRINT:PRINT:CURS448
01521C=INT(RND*600)+400:IF C(500THENGOTD1521
01522OUT240,6
01530PRINT"TOTAL ENERGY NOW EQUALS ";:FORU=PTOC+PSTEP+4:CURS473:PRINTU
01535NEXTI:F=P+C
01536OUT240,255
01550FORQ=1TO1000:NEXTQ:G=0:GOTD230
01600IF(G=0)OR(Q=0)THENRETURN
01610PRINT" B ";:Q=0:GOTD230
01800FORI=1TO1000:OUT240,251:OUT240,255:NEXTI
01801CUFSU:FIU:I=1TO40:PRINT[A91 35]:NEXTI
01802CURSO:FURI=1TO40:PRINT"      ";:NEXTI
01998CLS:LS=CURSO
01999GOTD5100
02000OUT5000
02300IFK(8THENPRINT"K":RETURN
02305N=INT(RND*100),IFN(55THENPRINT"      ";:RETURN
02310PRINT"K":RETURN
03000IFV=1THENRETURN
03001CLS:PRINT" LT. UHURA REPORTS MESSAGE"
03002PRINT" FROM STARLEFT COMMAND,"
03003PRINT"IT READS - KLINGON CRUISERS"
03004PRINT"RETREATING, YOU ARE TO CONTINUE"
03007PRINT"YOUR MISSION UNTIL ALL KLINGON"
03008PRINT"SHIPS DESTROYED"
03009PRINT"PRINT" -- STARLEFT COMMAND"
03010FORV=1TU/500:NEXTV:CLS:V=1:RETURN
05000CLS:PRINT"CONGRATULATIONS "S1*
05005PRINT"PRINT"YOU HAVE COMPLETED YOUR MISSION"
05010PRINT"SUCCESSFULY THE LAST KLINGON"
05011PRINT"INT" BATTLE CRUISER WAS DESTROYED."
05020PRINT"PRINT"STARFLEET COMMAND ISSUES ORDERS":PRINT" FOR"
05030N=INT(RND*4):IF N=0THENGOTD0530
05040IFN=1THENPRINT" PROMOTION TO ADMIRAL"
05050FN=2THENPRINT" THE MEDAL OF VALOR"
05060IFN=3OR(N=4)THENPRINT" 2 STARDADS LEAVE"
05070:RX=1TO1800:NEXTX:GOTD6000
05100CLS:CURS10:PRINT" BULLETIN"
05110PRINT"PRINT" TO ALL UNITS,WE HAVE BEEN"
05120PRINT"NOTIFIED THAT THE STARSHIP"
05130PRINT"ENTERPRISE HAS BEEN DESTROYED"
05140PRINT"WITH"K" KLINCON LEFT"
05141PRINT" "
05150N=INT(RND*3)+1:IFN=0THENGOTD05150
05151,FN=1THENLET71=1"DESTRUCTION"
05152,FN=2THENLET21=1"DIFFICULT TIMES"
05153,FN=3THENLET1=1"KLINCON OVERKLEMENT"
05160PRINT"PRINT THIS MEANS "Z1*
05161PRINT"FOR THE LEAD UNIT"
05170FORX=1TO2500:NEXTX
06000S1:PRINT"AGA";:INPUTY1*
06001IFY1=(1,1)"Y"THENRUN
06002NU

```

APPLE

Decimal-Hex for Apple et al.

By R Chalmers, Inala QLD

This program is designed to give your computer something to do when it would otherwise be standing idle (nothing looks more forlorn than an idle computer). In fact, this program will keep your terminal and printer

```

10 HOME :C = 0
20 FOR I = 0 TO 65535
30 N = I
40 N = INT (N)
50 N0 = BTR0 (N)
60 IF LEN (N0) = 1 THEN Z = 4
70 IF LEN (N0) = 2 THEN Z = 3: IF F = 0 THEN GOSUB 270
80 IF LEN (N0) = 3 THEN Z = 3: IF G = 0 THEN GOSUB 280
90 IF LEN (N0) = 4 THEN Z = 2: IF H = 0 THEN GOSUB 290
100 IF LEN (N0) = 5 THEN Z = 2: IF J = 0 THEN GOSUB 300
110 IF N > 65535 OR N < - 65536 THEN VTAB 15: PRINT "SORRY ! CAN'T HANDLE THIS"
120 IF N < 0 THEN N = N + 65536
130 PRINT N;"$";
140 HI = INT (N / 256):LO = N - HI * 256
150 HI = INT (HI / 16):H2 = HI - HI * 16
160 L1 = INT (LO / 16):L2 = LO - L1 * 16
170 X = HI: GOSUB 250
180 X = H2: GOSUB 250
190 X = L1: GOSUB 250
200 X = L2: GOSUB 250
210 IF C = Z THEN PRINT :C = 0: GOTO 230
220 PRINT " :";C = C + 1
230 NEXT I
240 END

```

occupied for a number of hours.

The whole idea of this type of output is to create a ready reference, to use when you are running another program.

Although written on the Apple, this program should be able to run on virtually any machine.

```

250 IF X < 10 THEN PRINT X: RETURN
260 X = X + 55: PRINT CHR$(X): RETURN
270 PRINT : PRINT "-----": PRINT : F = 1: RETU
RN
280 PRINT : PRINT "-----": PRINT : G = 1: RETU
RN
290 PRINT : PRINT "*****": PRINT : H = 1: RETU
RN
300 PRINT : PRINT "*****": PRINT : I = 1: RETU
RN

```

Dodgies for Apple.

By Michael Wann,
Parkes NSW

This program was written on a 48K Apple but could run on a 24K or 16K Apple. The object of the game is to dodge the lasers

coming down at you. Control is by using a paddle to move left and right. Difficulty can be changed by increasing all the FOR X=1 TO 18 statements. This will increase the number of lasers coming down at you.

```

5 DIM Z(15)
10 HOME:LET SC=0
20 PRINT:PRINT" ... DODGIES... "
30 PRINT:PRINT:PRINT" USE A PADDLE "
40 VTAB 20:PRINT" PRESS ANY KEY TO CONTINUE "
50 GET A$:HOME
60 FOR Y=1 TO 15:FOR X=1 TO 18
70 Z(X)=INT(RND(1)*127)+60:NEXT X
75 HGR
80 FOR Y=1 TO 15
90 LET U=INT(PDL(1)/2)+60
100 HCOLOR=0:HPLOT 0,150 TO 250,150
110 HCOLOR=INT(RND(1)*6)+1
120 FOR X=1 TO 18:HPLOT Z(X),Y:NEXT X
130 HPLOT U,150 TO U+5,150:NEXT Y

```

```

140 FOR X=1 TO 18
150 IF Z(X)>U-1 AND Z(X)<U+6 THEN GOTO 250
160 NEXT X:LET SC=SC+(INT(RND(1)*50)):NEXT I
170 PRINT CHR$(7):PRINT CHR$(7):GOTO 60
249 END
250 TEXT:HOME:VTAB 11:HTAB 15: PRINT" DEAD !! "
260 PRINT:PRINT" SCORE=";SC
270 FOR A=1 TO 5
280 FOR B=(-16326) TO (-16336)
290 LET S=PEEK(B)
300 NEXT B:NEXT A: VTAB 20:END

```

Galactic War for Apple.

By Michael Wann,
Parkes NSW

This program will run on a 48K Apple. It uses high-resolution graphics and the paddles to

control each player's movement (up and down). The object of the game is to dodge your enemy's lasers while firing your own by pressing the button on the paddle.

```

5 REM *** GALACTIC WAR ***
10 REM BY M.WANN
20 AS=0:XS=0
30 TEXT:HOME:GOSUB 5000
40 FOR I=1 TO 100
50 X=60:Y=PDL(0)
60 A=200:B=PDL(1)
70 HGR
80 IF Y<5 THEN LET Y=5
90 IF Y>155 THEN LET Y=155
100 IF B<5 THEN LET B=5
110 IF B>155 THEN LET B=155
120 HCOLOR=4
130 HPLOT X,Y TO X,Y:TO X+2,Y-3 TO X+8,Y TO

```

VZ200 Games Featuring Hi-Res Colour Graphics and Fantastic Sounds.

MORGOTH

Prepare yourself for medieval adventure in MORGOTH. Now you are pitted against fire-balls, giant spiders, ghosts and ghouls with only your bow and arrows for protection. Can you do battle in the underground caverns, ancient castle or the mirky forest? Find out. Morgoth features fantastic sound, a tantastic challenge and hi-res colour graphics!

VZ200 TAPE 16K, \$12.50

BOSKONE ALERT

The ULTIMATE experience in space combat. Battle "intelligent" escort fighters, drone kill pods, and attempt to destroy the 9 Deathstars. Complete with over 100 screens of space "map" to explore and a scanner to guide your craft with.

Move 8 directionally (all terrain scrolls 8 directionally) and fight in the time-space twisted Vortex field or the moving asteroid belt! Fast moving animated machine language action beyond any arcade game ever written! With sound! Includes detailed battle manual!

VZ200 TAPE 16K, \$12.50

RALLY RACER

Beware! Mad Morgan, Crazy Harry and his hoodlums are on the prowl in a fantastic maze trying to track you down. Is your super charger fast enough! Your car remains in the centre of the screen while objects move around it! Your fuel is limited and you have to knock down 10 flags, but don't despair. A grid scanner to your right indicates the position of your cars and your foes!

VZ200 TAPE 16K, \$12.50

DEFENCE PENETRATOR

Can you place strategically placed missile bases or will they SCRAMBLE our system?

Now as pilot of the Z-80 Anbnihilator your mission is to infiltrate enemy territory carrying deadly QUAKER 5000 space-to-surface super bombs and your own crafts high high output intercept to destroy torpedoes.

Enemy defences will try to eliminate you with auto-launch ballistic missiles and installations. Beware of rugged surface terrain, your diminishing fuel supply and meteor storms!

Can you cross the 2000 km of swooping scenarios? Can you reach the enemy COMMAND BASE and smash it to atoms? Written machine language with super smooth hi-res colour graphics and sound!

VZ200 TAPE 16K, \$12.50

VZ Monitor

Monitor Dis-Assemble (Z80 Code). Single Steps Programmes and many other features.

The BEST Monitor Available!

VZ200 16K Tape \$19.95

**TO ORDER
TURN TO PAGE 82.**

APPLE

```
X+2,Y+3 TO X,Y+1 TO X,Y  
140 HPLOT X+8,Y TO X+11,Y  
150 HPLOT X+4,Y+4 TO X,Y+4:HPLOT X+4,Y-4 TO X,Y-4  
150 HFLOT X+3,Y  
170 HCOLOR=1  
180 HPLOT A,B TO A-2,B-3 TO A-8,B TO A-2,B+3 TO  
A,B  
190 HPLOT A-8,B TO A-11,B  
200 HPLOT A+1,B+3 TO A-4,B+3:HPLOT A+1,B-3 TO  
A-4,B-3  
210 HPLOT A-3,B  
220 X=X:Y=Y:A=A:B=B:RESTORE  
230 GOSUB 500  
240 NEXT I  
250 IF XS>AS THEN GOTO 280  
260 IF XS<AS THEN GOTO 300  
270 HOME:VTAB 12:PRINT"  
GOTO 400  
280 HOME:VTAB 12:PRINT"  
:GOTO 400  
300 HOME:VTAB 12:PRINT"  
:GOTO 400  
399 END  
400 TEXT:VTAB 22:PRINT"  
GET D$  
410 IF D$="Y" THEN GOTO 5  
420 HOME  
430 VTAB 9:HTAB 16:INVERSE:PRINT"CHICKEN":NORMAL
```

```
440 END  
500 HOME:VTAB 21:PRINT" PLAYER * 1     PLAYER * 2"  
510 PRINT" SCORE=";XS;"      SCORE=";AS;"  
520 PRINT" TIME=";100-I  
530 IF PEEK(-16286)>127 THEN GOTO 750  
540 IF PEEK(-16287)>127 THEN GOTO 1000  
550 RETURN  
749 END  
750 REM PLAYER 2 FIRING  
760 HPLOT A-3,B-3 TO X,B TO A-3,B+3  
770 VTAB 1:FOR G=1 TO 3:PRINT CHR$(7):NEXT G  
780 IF B>Y-3 AND B<Y+3 THEN GOTO 800  
790 GOTO 540  
800 PRINT CHR$(7):LET AS=AS+1:GOTO 200  
999 END  
1000 REM PLAYER 1 FIRING  
1010 HPLOT X+3,Y-3 TO A,Y TO X+3,Y+3  
1020 VTAB 1:FOR J=1 TO 3:PRINT CHR$(7):NEXT J  
1030 IF Y>B-3 AND Y<B+3 THEN GOTO 1050  
1040 GOTO 550  
1050 PRINT CHR$(7):LET XS=XS+1: GOTO 200  
4999 END  
5000 HOME:INVERSE  
5010 FOR W=1 TO 120:PRINT" ":NEXT W  
5020 VTAB 2:FLASH:HTAB 9:PRINT"GALACTIC WAR"  
5030 VTAB 5  
5040 PRINT"      INSTRUCTIONS "  
5050 PRINT:PRINT" THIS IS A TWO PLAYER GAME."  
5060 PRINT" TRY TO DESTROY YOUR ENEMY."  
5070 PRINT" THERE IS A LIMITED AMOUNT"  
5080 PRINT" TIME AT THE END OF TIME THE"  
5085 PRINT" PLAYER WITH THE HIGHEST SCORE"  
5090 PRINT"      WINS !!!!! "  
5100 VTAB 22  
5110 PRINT" PRESS ANY KEY TO CONTINUE ";: GET C$  
5120 RETURN
```

SHARP & TANDY PCs

Caverns of Krull for TRS-80 & Sharp PCs.

By John Edwards,
MT Waverley Vic

Krull, an extremely evil cleric, has attacked and mortally wounded the good wizard Malchor. Malchor's prize possession, his magical Staff of Nature, was lost to Krull. Malchor has no strength left to save the staff, so he is sending you into Krull's underground hideout to rescue it. You must recover the staff before Krull begins his reign of terror upon the world.

A secret entrance has been found which leads into Krull's lair. Enter the caverns, rescue the staff and return to where you started.

The future of the world rests in your hands.

Instructions

A. Before running the program initialise the random number.

Type R = XXXX.XXXX (where XXXX.XXXX is any real number) and press ENTER.

B. A secret 'magic word' is also needed. Ask someone else to type W \$ = 'YYYYYYYY' (where YYYYYYYY is any seven-letter word) and press ENTER.

C. To start the program put the computer into DEF mode and type SHFT SPC.

D. The computer will give you a description of where you are. Read this and type ENTER.

E. Now the computer checks for a monster or treasure in this room. There are four possible outcomes:

Outcome One:

If there is a monster here the computer will describe it. Once you have read this press ENTER.

a) The computer now shows your 'health points' (HP); an indication of how strong you are. You are dead if your health points fall below zero. Also on the screen are your 'ENEMY'S HEALTH POINTS' (HE). This indicates the strength of the monster. Once you have read this press ENTER.

b) You are now asked if you wish to fight the monster. If so, type any letter except N and press ENTER. If you do not wish to fight, press N. When fighting, the computer subtracts a random number of health points from each combatant. The monster will die if its health

points reach zero. If they remain above zero the computer will again ask if you wish to fight. If you look like losing you can run away. Killing the monster or withdrawing from combat - go to part F.

Outcome 2:

If there is treasure in the room the computer will display what it is. Once you have read this press ENTER.

a) The computer will ask if you wish to take this. If you do, type the single letter Y and press ENTER. The computer adds the point value of this treasure onto your score.

b) If you don't want the treasure, type any letter apart from Y and press ENTER.

Outcome 3:

If there is both a monster and some treasure in the room the computer will signal this by printing 'GUARD HERE!'. Once you have read this press ENTER. The computer deals with the monster first and the procedure is as in E 1). The treasure is dealt with next and the procedure is as in E 2).

Note: Treasure can only be

taken once the monster guarding it is killed. If you do not fight the monster you cannot take the treasure.

Outcome 4:

If there is neither a monster nor treasure then you can exit to another room.

F. 'Exiting' Rooms

After entering a room you will be presented with a display showing the exits. The directions (N)orth, (S)outh, (E)ast, (W)est are displayed with corresponding numbers.

If a direction is displayed with a zero next to it it means you cannot go this way.

Select the direction you wish to travel in and note the corresponding number in your head. Press ENTER.

The computer now asks which direction you wish to go. Type in the number which corresponds to your desired direction and press ENTER.

You are now in a new room and at step D.

G. One Final Note -

Some passages between the rooms are magical and allow travel in only one direction.

SHARP & TANDY PCs

Sample Journey

IN A DARK CHAMBE R EXITS N 0,S 2,E 4,W O TO? 4	EXITS N 4,S 9,E 5,W 2 TO? 5	14 YOUR HP= 16 HE= 12 YOUR HP= 14 HE= 10 YOUR HP= 14 HE= 9 YOUR HP= 12 HE= 7 YOUR HP= 10 HE= 5 YOUR HP= 9 HE= 5 YOUR HP= 9 HE= 2 IT DIED! EXITS N 0,S 6,E 0,W 1 TO? 6	3 EXITS N 0,S 6,E 0,W 1 TO? 1	IN A STORE THERE ARE RINGS HERE EXITS N 7,S 0,E 0,W 10 TO? 10
IN A DIRTY GROTT O GUARD HERE! A ORC IS HERE YOUR HP= 20 HE= 7 YOUR HP= 19 HE= 6 YOUR HP= 18 HE= 6 YOUR HP= 18 HE= 4 IT DIED! THERE ARE COINS HERE EXITS N 0,S 1,E 0,W 3 TO? 1	IN A DANK CAVE A DWARF IS HERE YOUR HP= 20 HE= 3 YOUR HP= 20 HE= 1 IT DIED! EXITS N 0,S 6,E 0,W 1 TO? 6	YOUR HP= 14 HE= 10 YOUR HP= 14 HE= 9 YOUR HP= 12 HE= 7 YOUR HP= 10 HE= 5 YOUR HP= 9 HE= 5 IT DIED! PARCHMENT READS: FRED EXITS N 5,S 0,E 0,W 0 TO? 5	IN A COLD PASSAG E EXITS N 4,S 9,E 5,W 2 TO? 9	IN A LARGE HALL GUARD HERE! A TROLL IS HERE YOUR HP= 11 HE= 10 EXITS N 0,S 0,E 8,W 14 TO? 14
IN A COLD PASSAG E	IN A DANK CAVE A DWARF IS HERE YOUR HP= 18 HE= 18 YOUR HP= 20 HE= 15 YOUR HP= 20 HE= 14	YOUR HP= 11 HE= 11 TO? 8	IN A DEEP PIT EXITS N 1,S 12,E 7,W 11 TO? 7	IN A SMALL ROOM A ORC IS HERE YOUR HP= 11 HE= 8 EXITS N 0,S 8,E 0,W 0 TO? 8
				IN A SMALL CAVE THERE ARE COINS HERE EXITS N 13,S 0,E 10,W 0

-SCORE=4795.

ALIEN TAXI

Your goal is to pick up and deliver passengers to an underground resort hotel. There is a fare at each of the 12 taxi stands on the first level and if you complete that level there are 12 more on the second level. This is a very skilled game and will take a long time to master.

TRS-80 Model I/III System 80 TAPE 16K, \$24.95.

DESERT PERIL

Your cities have been infected by a deadly virus from the planetary war with the Zagons. Your people's only chance to survive is for you to cross the Great Desert and clear a path for your people to follow. But there are many dangers. The Zagons have mined the desert and have put killer satellites, drone bomber balloons, and flying dragons along the whole trail. The future of your planet's race depends on your skill and daring.

TRS-80 Model I/III System 80 TAPE 16K, \$24.95.

MORGOTH

Prepare yourself for medieval adventure in MORGOTH. Now you are pitted against fire-balls, giant spiders, ghosts and ghouls with only your bow and arrows for protection. Can you do battle in the underground caverns, ancient castle or the mirky forest? Find out. Like RALLY RACER, your character is always at the centre of the screen. Morgoth features fantastic sound, a fantastic challenge and an entire moving forest!

TRS-80 Model I/III System 80 TAPE 16K, \$25.50.

OUTLAND

As defender of Colony 7 you must beat back the lethal attacks of the Xenos empire! Beware of Star Raiders, Advisors, Scoutships, Star Destroyers and the deadly flagship. Avoid plasma bolts and laser beams in this super smooth machine language arcade game with sound. The detailed animated graphic's MUST be seen!

TRS-80 Model I/III System 80 TAPE 16K. \$25.50.

BOSKONE ALERT

The ULTIMATE experience in space combat. Battle "intelligent" escort fighters, drone kill pods, and attempt to destroy the 9 Deathstars. Complete with over 100 screens of space "map" to explore and a scanner to guide your craft with. Move 8 directionally (all terrain scrolls 8 directionally) and fight in the time-space twisted Vortex field or the moving asteroid belt! Fast moving animated machine language action beyond any arcade game ever written! With sound! Includes detailed battle manual!

TRS-80 Model I/III System 80 TAPE 16K, \$25.50.

RALLY RACER

Beware! Mad Morgan, Crazy Harry and his hoodlums are on the prowl in a fantastic (32 screens!) of maze trying to track you down. Is your super charger fast enough! Your car remains in the centre of the screen while objects move around it! Your fuel is limited and you have to knock down 10 flags, but don't despair. A grid scanner to your right indicates the position of your cars and your toes!

TRS-80 Model I/III System 80 TAPE 16K, \$24.95.

STELLAR WARP

Only you can save the universe! As your craft hurtles through space it's attacked by RAZER BLADES, PODS, SPANKERS and SOLAROIDS! As every second ticks by they become more powerful. As your shield blackens you hit STELLAR WARP, now glowing with indestructible energy all space and time contorts allowing you to ram them while in the safety of hyperspace. Super smooth animated graphics and talking sound effects combine to bring you fantastic action!

TRS-80 Model I/III System 80 TAPE 16K, \$24.95.

TO ORDER

TURNTOPAGE 82.

SHARP & TANDY PCs

```

1:L$$="COLD":M$    72:N$$="ORC":      :IF I<0
="PASSAGE":A      RETURN          PRINT "IT DI
=4:B=9:C=5:D    73:N$$="TROLL":     ED!" :F=F+15S
=2:RETURN        RETURN          :G=G+2:
2:L$$="BIG":M$=   74:N$$="GHOUL":   RETURN
"CAVERN":A=3     RETURN          285:GOSUB 80:G=G
:B=13:I=6:       80:R=1000*LOG <
:RETURN          137/R):R=R-      -INT (3R):IF
3:L$$="DARK":M$   INT (R):       GOTO 265
="CHAMBER":B     RETURN          286:PRINT "YOU D
=2:C=4:          100:" 0=3:F=0:G  IE!"
:RETURN          =20:V=0      287:USING :PRINT
4:L$$="DIRTY":M   110:A=0:B=0:C=0: "SCORE";F:
=$="GROTTO":B    D=0:E=0:I=0:  END
=1:D=3:E=1:I=    GOSUB 0
=7:RETURN        115:PRINT "IN A
5:L$$="DANK":M$   120:IF (E>0)*(I>  ";L$$" ;M$
="CAVE":B=6:     O>1PRINT "G
D=1:I=3:         UARD HERE!"  125:IF EGOSUB 25
:RETURN          130:IF EGOSUB 17
6:L$$="ROCKY":M   135:PAUSE "EXITS
=$="HOLE":A=5    ":PRINT          USING "####";
:I=18:E=5:       140:INPUT "TO?";J
:RETURN          142:IF (J=3)*(V>0)=1PRINT "M
7:L$$="SMALL":M  145:IF J=12GOTO 287
=$="ROOM":B=8    ISSION SUCC
:I=8:RETURN      SSFULL":GOTO
8:L$$="STORE":M   150:IF J=0GOTO 1
=$:"":A=7:D=1    155:IF (J>A)+(J<>B)+(J>C)+(J<>D)=4GOTO
:O=1:E=1:RETURN  160:0=J:GOTO 110
19:L$$="DEEP":M$  170:IF IRETURN
="PIT":A=1:B=    173:IF E=5PRINT
=12:C=7:D=11    "PARCHMENT R
:RETURN          EAOS: "IW$":E=0:RETURN
10:L$$="LARGE":M  20
=$="HALL":C=8
:D=14:I=10:E=    150:IF J=0GOTO 1
:1:RETURN        155:IF (J>A)+(J<>B)+(J>C)+(J<>D)=4GOTO
11:L$$="GUARD":M  160:0=J:GOTO 110
=$="ROOM":C=9    170:IF IRETURN
:B=10:D=13:I=    173:IF E=5PRINT
=15:E=1:RETURN   "PARCHMENT R
:RETURN          EAOS: "IW$":E=0:RETURN
13:L$$="DUSTY":M  20
=$="TOMB":C=1    180:GOSUB 80:H=
:1:B=14:E=1:I=    INT (4R)+1:H
=9:RETURN        =50+H:GOSUB
14:L$$="SMALL":M  185:PRINT "THERE
=$="CAVE":A=1    ARE ";Q$;" HERE":INPUT
:3:D=10:E=1:     "TAKE?";J$:IF J$="Y":LET
:RETURN          F=F+10:H:E=0
20:PRINT "IN A    190:RETURN
TEMPLE":I=20    255:GOSUB 80:S=
:GOSUB 255      INT (4R)+1:S
21:IF IPRINT "N  =70+S:GOSUB
O EXIT":GOTO 20
20
22:INPUT "MAGIC    260:PRINT "A ";IN
DOOR, WORD?"    $;" IS HERE"
:IT$:IF T$=W$    265:PRINT "YOUR
PRINT "STAFF    HP=";G$:HE=
FOUND,NOW E    ";I:GOSUB 80
SCAPE!":O=9:    270:INPUT "FIGHT
V=1:GOTO 110    ?";K$:IF K$=
23:O=14:GOTO 11  "N":RETURN
0
51:Q$$="DARTS":  275:I=I-INT (5R)
:RETURN
52:Q$$="DOING":  RETURN
:RETURN
53:Q$$="RINGS":  RETURN
:RETURN
54:Q$$="GEMS":   RETURN
:RETURN
71:N$$="INWARF": RETURN
:RETURN

```

VIC-20

Piano for the VIC-20.

**By Douglas Fahlbusch,
Longford TAS**

The program simulates a piano by allowing a whole octave to be played from the keyboard. It can store a tune typed in and play it back.

When entering a tune it

should be noted that Duration 1 is equivalent to one pulse, Duration 2 is equivalent to two, etc. If a wrong note is entered, type a '-' for the following note. This returns the program to the previous note so that it may be re-entered.

```

100 POKE56,28:POKE55,0:CLR:POKE7670,0
110 POKE36879,127:GOSUB370
120 V=36878:S=-3:POKEV,15
130 S$="00000000000000000000000000000000 "
140 PRINTS$"||USE THE KEYS TO PLAY
150 GETA$:IFRA$=""THEN150
160 IFA$="W"THENN=195:GOT0340
170 IFA$="3"THENN=199:GOT0340
180 IFA$="E"THENN=201:GOT0340
190 IFA$="4"THENN=203:GOT0340
200 IFA$="R"THENN=207:GOT0340
210 IFA$="T"THENN=209:GOT0340
220 IFA$="6"THENN=212:GOT0340
230 IFA$="Y"THENN=215:GOT0340
240 IFA$="?"THENN=217:GOT0340
250 IFA$="U"THENN=219:GOT0340
260 IFA$="8"THENN=221:GOT0340
270 IFA$="I"THENN=223:GOT0340
280 IFA$="0"THENN=225:GOT0340
290 IFA$=" "THENN=0:GOT0340
300 IFA$="■"THEN480:REM ENTER TUNE
310 IFA$="■"THEN750:REM PLAY TUNE
320 IFA$="■"THEN350:REM END
330 GOT0140
340 POKES,0:POKES,N:GOT0140
350 POKES,0:POKEV,0:POKE36879,27:PRINT"■";
360 POKES55,0:POKE56,30:CLR:END
370 PRINT"■":FORL=1TO?
380 PRINT" | 1 2 3 4 5 6 7 8 9 0 | !":NEXT
390 PRINT"11 1 33 34 1 36 37 38 1 10"
400 PRINT" | | | | | | | | | | "
410 PRINT" I W E I R T Y U I I O "
420 PRINT"
430 PRINT"■ SPACE FOR SILENCE.
440 PRINT"■ ■1■ - STORE A TUNE
450 PRINT"■ ■3■ - PLAY THE TUNE
460 PRINT"■ ■7■ - END ROUTINES
470 RETURN
480 POKES,0:L=7169:C=0:GOT0540
490 L=L+1:PRINTS$"DURATION 1,2,3,4?
500 GETA$:N=VAL(A$)
510 IFA$="~"THEN700
520 IFN10RN>4THEN500
530 POKEL,N
540 C=C+1:PRINTS$"ENTER NOTE"C"|| "
550 GETA$:IFRA$=""THEN550
560 IFA$="W"THENN=195:GOT0730
570 IFA$="3"THENN=199:GOT0730
580 IFA$="E"THENN=201:GOT0730
590 IFA$="4"THENN=203:GOT0730
600 IFA$="R"THENN=207:GOT0730
610 IFA$="T"THENN=209:GOT0730
620 IFA$="6"THENN=212:GOT0730
630 IFA$="Y"THENN=215:GOT0730
640 IFA$="?"THENN=217:GOT0730
650 IFA$="U"THENN=219:GOT0730
660 IFA$="8"THENN=221:GOT0730
670 IFA$="I"THENN=223:GOT0730
680 IFA$="0"THENN=225:GOT0730
690 IFA$=" "THENN=1:GOT0730
700 IFA$="~"ANDC>1THENL=L-2:C=C-2:POKES,PEEK(L-1):GOT0540
710 IFA$="■"THENN=0:GOT0730
720 C=C-1:GOT0540
730 L=L+1:POKEL,N:POKES,0:POKES,N:IFNANDL<7670THEN490
740 PRINTS$"||PLAYING TUNE":GOT0140
750 POKES,0:L=7169:PRINTS$"PLAYING TUNE "
760 GETA$:IFRA$=""THEN790
770 L=L+1:N=PEEK(L):POKES,0:POKES,N
780 IFNTHENL=L+1:D=PEEK(L):FORN=1TO*D*200:NEXT:GOT0760
790 POKES,0:PRINTS$"":GOT0140
READY

```

VIC-20

Snake for VIC-20.

By C J Allen

The game SNAKE is not an original idea. You control a moving snake on the screen. Periodically, mice will appear on the screen. You guide the snake over to the mouse (using a joystick) and eat it. For each mouse you eat you score five points, but your tail grows a little longer.

Occasionally birds' eggs will appear on the screen. These are low in fat but high in protein

so if you eat one you will score ten points without growing too much. The game ends when you bite either your tail or the wall surrounding your field. If you do not have a joystick then delete lines 71, 75, 76, 80 and 90 and enter these lines:

```
75 S = PEEK (197): IF S = 17
THEN C = U:HE = 2
IF S = 33 " C = D:HE = 3
IF S = 28 " C = R:HE = 0
IF S = 35 " C = L:HE = 1
```

This will set the A, Z, B and N keys for Up, Down, Left and Right respectively.

```
1 PRINT "J$PC(117)" "SNAKE": 00T07000:REM BY CHRIS ALLEN
5 DIM(X(185),P(8,6):D=22:U=-22:L=-1:R=1
6 POKE36869,253:POKE36879,91:Z1=7686:X=5:HE=3:J=1:ZH=0:DD=0:SC=0:Z=7727:V=3
5878
18 TI$="00000001":MX(1)=7727:CH=36726:IV=37139:JX=37154:POKEJV,0:POKEJX,127:PX(4)=
2:PX(5)=2
15 C=22:FORN=Z1T081648STEP22:POKE,N,11:POKE+N,CM,3:NEXT
28 DE=C:POKE,V,2:POKE,V,1,252:S=PEEK(JY-2)
71 S0=((SAND4)=0):S1=-((SAND6)=0):S2=((SAND16)=0):S=PEEK(JX-2):S3=-((SAND128)=0)
74 IFC=DORC=UTHENE8
75 IFS8=LTHENC=U:HE=2
76 IFS1=RTHENC=I:HE=3
77 GOTO900
88 IFS3=RTHENC=R:HE=0
```

```
98 IFB2=LTHENC=L:HE=1
99 Z=Z+C:(IPEEK(Z))>10ANDPEEK(Z)>32ANDPEEK(Z)>12THEN4000
998 IFZ>61850R2C21THEM4000
998 IPEEK(Z)>18THENH=X+4:SC=SC+5:00SUB6000
1000 IPEEK(Z)=12THENSC=SC+16:X=X+1:00SUB6000
1101 IFD=UTHEN1124
1102 IFD=LHDIC=RORDE=LANDC=DTHENNE=9:GOT01129
1103 IFD=LHDIC=RORDE=DTHENNE=7:GOT01129
1104 IFD=LHDIC=RORDE=LANDC=UTHENNE=8:GOT01129
1105 IFD=LHDIC=RORDE=UTHENNE=6:GOT01129
1124 IFD=UORC=DTHENNE=4:GOT01129
1125 IFD=LORC=RTHENNE=6
1129 POKEZ=HE:POKEZ+CM,0:POKEZ-C,HE:POKEZ-C+CM,0
1178 JE=J+1:MX(J)=2:IFTIC(0000005)THEH1600
1185 IFD=QTHENZK2X<(K-QD):QD=K
1190 ZX=ZK-1:POKEK(ZD-ZX),82:POKEK(ZD-ZX)+CM,33
1200 IFJ=185THEHDD=J:J=0:ZX=0:QD=K
1600 PI=Z1+INT(RND(1)*565):IPEEK(P1)>32THEN1600
1620 H=INT(RND(1)*62):IFH>58ANDH>12ANDH>9THEN20
1630 RH=RND(1)*16:0=0+4:IF0>5THEH0=8
1650 SI=0-3:IPSI<0THEH51=0+3
1670 PK(0)=P1:POKE1,18:IPEEK(PK(S1))=100PEEK(P(S1))=12THEHPOKEP(S1),32
1680 IFRND5AND0=2THEHPOKEP1,12
1700 GOT028
4000 POKEV,-1,228:FORN=15T028STEP-1:POKEV,M:FORO=1T0128:NEXT:NEXT:NEXT:POKEV-1,0
4100 FORO=1T04000:NEXT:POKE36869,248:POKEJN,253:IFSC>HITHENHI=SC
4451 POKE,V,0:POKE36879,238:PRINT"MMW/YOU SCORED";SC;"#POINTS":PRINT"MMHIGH SCOR
EB";HI;"#POINTS"
4460 PRINT"MMW/PLAY AGAIN (Y/N) ?":"
4465 GETRS:IFRS="":THEH4465
4470 IFRS="N":THEHPRINT"1":THEH4465
4500 POKE36869,248:POKE56,38:POKE51,8:POKE55,0:POKE36879,27:END
5000 N3=INT(SC/100):N2=INT(SC-N3*100)/10:NI=INT(SC-(N3*100+10)):POKEZ1+CM,0
5010 POKEZ1+CM+22,0:POKEZ1+CM+4,0:POKEZ1,N3+48:POKEZ1+22,N2+48:POKEZ1+44,NI+48
5070 FORN=1T0368STEP2:POKEV,15:POKEV-1,280H:NEXT:POKEV-1,0:POKEV-4,150
5100 FORN=1T078:H:NEXT:POKEV-4,0:POKEV,0:RETURN
5000 POKE52,PEEK(56)-2:POKE56,PEEK(56)-2:POKE51,PEEK(55):CLR
7020 DT=32768:CC=256PEEK(52)+PEEK(51)
7030 FORI=0T0511:POKECC,I:PEEK(DT+I):NEXT
7040 FORI=0T0103:READT:POKECC,I,T:NEXT
7050 FORI=1T0127,72,213,72,112,14,18,171,64,64,171,18,14,40,24,36,66,165,129
,231,36
7070 DATR36,231,129,165,66,36,24,48,44,52,44,52,44,52,44,52,0,0,255,170,85,255,0
,0
7080 DATR44,52,204,36,72,248,8,0,0,0,248,72,36,204,52,44,36,44,43,26,13,7,0,0
7090 DATR,8,0,7,13,26,43,44,36,66,231,235,219,235,255,182,24
7095 DATR235,255,235,255,235,235,235,235,24,68,126,126,126,68,24,0
7100 PRINT"1":GOT05
READY.
```

HITACHI

Cube Rotation for Hitachi MB16001.

By M Jarvis, Duffy ACT

This program rotates a cube on the screen of a Hitachi MB 16001. You set the length of side (line 120), the co-ordinates of the centrepoint (lines 130-140), the starting angles, and increment angles, about the centrepoint on two axes, (lines 250-260 and 270-280 respectively).

You will then see a cube of straight lines rotate.

With a little thought, this program should be able to be converted to Applesoft etc. It can also be used to rotate any three dimensional object. Lines 30-50 are the three dimensional co-ordinates of the cubes vertices, and lines 470-580 are the lines joining these points.

```
10 K = 0: M = 1
20 DIM P(8,3)
30 DATA -.5,-.5,-.5,-.5,.5,-.5,.5,-.5,-.5
50 DATA -.5,-.5,.5,-.5,.5,.5,.5,.5,-.5,.5
110 CLS
120 INPUT "SCALE = ",S
130 INPUT "XSHIFT = ",XS
140 INPUT "YSHIFT = ",YS
150 FOR I = 1 TO 8
160 FOR J = 1 TO 3
170 READ P(I,J)
180 NEXT J
190 NEXT I
200 FOR I = 1 TO 8
210 FOR J = 1 TO 3
220 P(I,J) = S * P(I,J)
230 NEXT J
240 NEXT I
250 INPUT "THETA = ",TH
260 INPUT "PHI = ",PH
```

```
270 INPUT "DTH = ",DTH
280 INPUT "DPH = ",DPH
290 TH = (TH * 3.14159) / 180
300 PH = (PH * 3.14159) / 180
310 COSTH = COS (TH)
320 SINTH = SIN (TH)
330 COSPH = COS (PH)
340 SINPH = SIN (PH)
350 FOR I = 1 TO 8
360 TE = P(I,1)
370 P(I,1) = P(I,1) * COSTH - P(I,2) * SINTH
380 P(I,2) = P(I,2) * COSTH + TE * SINTH
390 P(I,2) = P(I,2) * COSPH - P(I,3) * SINPH
400 P(I,1)' = P(I,1) * .6 + XS : P(I,2) = P(I,2) + YS
420 NEXT I
430 SWAP K,M
440 SCREEN 3,1,0,0,1,K,M : CLS
450 R = 4
470 LINE (P(1,1),P(1,2))-(P(2,1),P(2,2)),R
480 LINE (P(1,1),P(1,2))-(P(4,1),P(4,2)),R
490 LINE (P(4,1),P(4,2))-(P(3,1),P(3,2)),R
500 LINE (P(2,1),P(2,2))-(P(3,1),P(3,2)),R
510 LINE (P(5,1),P(5,2))-(P(6,1),P(6,2)),R
520 LINE (P(5,1),P(5,2))-(P(8,1),P(8,2)),R
530 LINE (P(8,1),P(8,2))-(P(7,1),P(7,2)),R
540 LINE (P(6,1),P(6,2))-(P(7,1),P(7,2)),R
550 LINE (P(1,1),P(1,2))-(P(5,1),P(5,2)),R
560 LINE (P(2,1),P(2,2))-(P(6,1),P(6,2)),R
570 LINE (P(3,1),P(3,2))-(P(7,1),P(7,2)),R
580 LINE (P(4,1),P(4,2))-(P(8,1),P(8,2)),R
590 TH = TH + DTH : PH = PH + DPH
610 RESTORE
620 FOR I = 1 TO 8
630 FOR J = 1 TO 3
640 READ P(I,J)
650 P(I,J) = P(I,J) * S
660 NEXT J
670 NEXT I
680 GOTO 310
```

HITACHI

Remprint for Hitachi Peach.

By D J Omond

REMARKS lines have a useful application as a means of storing either textual or diagrammatic information for future use or reference. REMPRINT removes the line number and remarks symbol ('') to give a 'clean' printout.

A program is prepared with

```

10 '      ((((( REMPRINT )))))
20 '
30 '      by D.J.Omond 1983
40 '
50 CLS:WIDTH 40
60 INPUT"Start Line Number ",S$
70 S=VAL(S$)
80 INPUT"End Line Number   ",E$
90 E=VAL(E$)
100 WIDTH 80:OPEN"O",#1,"LPT0:"
110 '**** BASIC prog. start address
120 A=PEEK(&H1D)*256+PEEK(&H1E)
130 '**** Read Line number
140 L=PEEK(A+2)*256+PEEK(A+3)
150 '**** Read Next line address
160 NL=PEEK(A)*256+PEEK(A+1)
170 '**** Look for Start Line Number
180 IF L(S THEN 190 ELSE 210
190 A=NL:GOTO 140
200 '**** Read complete line
210 G=0:FOR J=A+2 TO NL-1
220 F=PEEK(J)
230 '*** Flag G set when start of Re-
240 '*** marks symbol '' is found
250 IF G=1 THEN 280 ELSE 260
260 IF F()141 THEN 290 ELSE G=1
270 GOTO 290
280 PRINT CHR$(F);:PRINT #1,CHR$(F);
290 NEXT J
300 PRINT:PRINT #1:A=NL
310 IF L)=E THEN 320 ELSE 140
320 END
330 '
340 ' Example:      Jones Family Tree
350 '
360 'Thomas Jones m. Agatha Smith (m.1863)
370 ' b.1842 : b.1840
380 ' d.1892 : d.1908
390 ' .....:.....
400 ' : : : :
410 ' Thomas Robert Sarah Dorothy
420 ' b.1863 b.1865 b.1867 b.1868

```

the required data on each line preceded by the remarks symbol (''). Updating, additions and corrections can be made using screen editing instructions, for example LIST to display, RENUM to make space for additional information, INS/DEL and so on. REMPRINT is then run to provide a printout. The listing includes a sample genealogical chart.

BASIC

Designs Program for Basic III Pet.

By Douglas Fahibusch,
Longford TAS

The program generates a trail which moves either up, down, left or right at random. If the line encounters a full block it prints a space. If it encounters a

space it prints a full block.

By this method the computer prints interesting designs which are quite fascinating to watch. The pokes which place the line on the screen are accompanied by clicks generated with a speaker connected to the user port.

```

100 PRINT":PRESS 'E' TO END."
110 FORL=1TO2000:NEXT
120 PRINT"J":S=59464:REM SOUND
130 POKE$+3,16:POKE$+2,15:POKE$,0
140 FORL=0TO4:X=INT(RND(1)*599)+32968
150 POKEX,160:POKES,100
160 FORM=1TO100:NEXT
170 POKE$,0:POKEX,32:NEXT
180 POKEX,160
190 R=INT(RND(1)*4+1):REM DIRECTION
200 D=INT(RND(1)*5+2):REM NO. ADVANCES
210 ONRGOTO220,230,240,250
220 M=-40:GOTO260
230 M=40:GOTO260
240 M=-1:GOTO260
250 M=1:GOTO260
260 FORL=1TO:D:X=X+M:REM INCREMENT
270 GETA$:IF A$="E"THEN340 CHECK END
280 IF X>337670RX<32768THENX=X-S*M:GOTO190 CHECK RANGE
290 P=PEEK(X):REM FIND LOC.'S
300 IFF=32THENR=160:REM VALUE, AND
310 IFF=160THENR=32:REM SWAP
320 POKE$,200:POKEX,A:POKES,0
330 NEXT:GOTO190:REM START AGAIN
340 POKE$,0:POKES+2,0:POKES+3,0
350 PRINT"J";END

```

COMMODORE

Disk File Copy for Commodore 64.

By N Carlsen

Copying a sequential file from one disk to another is not trivial on a Commodore 64.

This program allows you to

copy program, user or sequential files from disk to a temporary cassette file and then back to another floppy disk. As it works on a byte by byte basis it is rather slow but pays results.

```

1 REM TRANSFERS A FILE FROM A DISK TO A
2 REM TAPE FILE AND THEN BACK TO A DISK.
3 REM GIVES A DISK TO DISK COPY OPTION
4 REM WITH A SINGLE DISK DRIVE.
5 REM
6 REM AUTHOR: N.R.CARLSSEN
7 REM          NHULUNBUY N.T. 5787
8 REM
9 PRINT "SET UP CASSETTE AND DISK THEN"
10 INPUT "INPUT DISK FILE NAME"/T#
11 INPUT "FILE TYPE (S/P/U)"/T#
12 T$=LEFT(T$,1)
13 IF T$>"S" THEN IF T$>"P" THEN IF T$>"U" THEN 20
14 K$="T"+FS
15 REM PROVIDE A UNIQUE TERMINATOR.
16 E$="#%ZNC"
17 N$=LEN(E$)
18 OPEN 15,8,15

```

COMMODORE

```

50 OPEN 5,0,S,"01"+FS+", "+TS+",R"
55 OPEN 10,1,1,K8
60 GOSUB 200
65 FX=0
68 PRINT#PRINT "          DISK DATA IN#PRINT
70 DETNS,AS
72 IF ST=64 THEN FX=1:GOTO 90
80 IF STK>0 THEN PRINT "STATUS = "+ST:GOTO 300
80 VX=ASC(A$+CHR$(B))
82 PRINT VX,
85 IF VX=0 THEN PRINT#10,CHR$(B)
87 IF VKK>0 THEN PRINT#10,AS
90 IF FX=1 THEN PRINT#10,EOF#PRINT " EOF":GOTO 300
100 GOTO 70
200 INPUT#10,AS,B8,C8,D8
210 IF VAL(AS)>0 THEN PRINT "ERROR CHANNEL = "+AS,B8,C8,D8:GOTO 300
220 RETURN
300 CLOSE 10
302 PRINT
305 PRINT "TAPE FILE 10 CLOSED"
310 CLOSE 5
315 PRINT "DISK FILE 5 CLOSED"
320 CLOSE 15
325 PRINT "ERROR CHANNEL FILE 15 CLOSED"
327 PRINT
330 PRINT "DO YOU WISH TO TRANSFER THE FILE TO ANOTHER DISK (Y/N)?"
335 GET RS:IF RS="" THEN 350
355 IF RS>"N" THEN 370
360 PRINT "DO YOU WISH TO COPY ANOTHER FILE (Y/N)?"
362 GET QS:IF QS="" THEN 362
363 IF QS="N" THEN PRINT#PRINT "THANKS...HAVE A NICE DAY!":PRINT#END
364 IF QS>"Y" THEN 360
365 GOTO 3
370 IF RS>"Y" THEN 330
380 PRINT "PRESS ANY KEY WHEN DISK AND CASSETTE"
381 PRINT "ARE CORRECTLY POSITIONED."
388 GET RS:IF RS="" THEN 380
400 OPEN 15,0,15
410 OPEN 5,0,S,"01"+FS+", "+TS+",W"
420 OPEN 10,1,0,K8
430 GOSUB 200
435 GOSUB 200
437 PRINT#PRINT "          DATA TO DISK#PRINT
440 GET#10,AS
450 REM IGNORE ANY TAPE EOF INDICATORS.
460 IF ST=64 THEN 470
470 IF STK>0 THEN PRINT "STATUS = "+ST:GOTO 300
475 IF AS=B8 THEN GOSUB 1000:GOTO 530
480 GOSUB 200
510 PRINT#5,S8
515 FOR X=1 TO LEN(S8):PRINT ASC(MID$(S8,X,1))+CHR$(B)),NEXT X
520 GOSUB 200
525 GOTO 440
530 VX=ASC(A$+CHR$(B))
535 IF VX=0 THEN S8=S8+CHR$(B)
540 IF VX>0 THEN S8=S8+A$ 
545 RETURN
550 S8="":LEFT$(S8,1):JX=1:RETURN
1000 GOSUB 200
1010 IF LEN(S8)=0 THEN PRINT " EOF":GOTO 300
1020 JX=JX+1:LEFT$(S8,JX,1):RETURN

```

```

10 REM TATTSLotto SCAN
15 REM P SCOFIELD 25/1/83
20 DIM A$(18):REM A$=NUMBERS OWNER
25 REM SET COUNTERS,N=NUMBERS CORRECT
30 REM S=SUPP NUMBER, SQ=SQUARE NUMBER
35 REM P=NUMBER OF PRIZES
40 N=0:S=0:SQ=0:P=0
45 ? CHR$(125):REM CLEAR SCREEN
50 ? "          TATTSLotto SCAN "
55 POSITION 2,5
60 ? "TYPE IN THE NUMBERS INDICATED."
65 PRINT
70 ? "1ST NO=":INPUT N1
75 ? "2ND NO=":INPUT N2
80 ? "3RD NO=":INPUT N3
85 ? "4TH NO=":INPUT N4
90 ? "5TH NO=":INPUT N5
95 ? "6TH NO=":INPUT N6
100 ? "SUP NO=":INPUT N7
105 ? CHR$(125)
110 ? "TATTSLotto SCAN IN PROGRESS."
115 PRINT
120 REM READ NAME AND NUMBERS
125 READ A$,T:SQ=SQ+1:REM COUNT SQ'S
130 FOR A=1 TO T+1:READ X
135 IF X=0 THEN 200:IF X=-1 THEN 200
140 REM COUNT CORRECT NUMBERS
145 IF N1=X THEN N=N+1
150 IF N2=X THEN N=N+1
155 IF N3=X THEN N=N+1
160 IF N4=X THEN N=N+1
165 IF N5=X THEN N=N+1
170 IF N6=X THEN N=N+1
175 IF N7=X THEN S=1:REM SUPP NUMBER
180 NEXT A
200 REM DISPLAY RESULTS
205 IF N>8<4 THEN 250
210 P=P+1:REM COUNTING PRIZES
215 IF N=6 THEN ? "1ST DIVISION SQ: ";SQ;" ";A$ 
220 IF N=4 THEN ? "4TH DIVISION SQ: ";SQ;" ";A$ 
225 IF S=0 THEN 245
230 IF N>4 THEN ? "5TH DIVISION SQ: ";SQ;" ";A$ 
235 IF N>6 THEN ? "2ND DIVISION SQ: ";SQ;" ";A$ 
240 GOTO 250
245 IF N=5 THEN ? "3RD DIVISION SQ: ";SQ;" ";A$ 
250 N=0:S=0:REM RESET COUNTERS
255 IF X=0 THEN 120
260 IF P=0 THEN POSITION 2,10:?"BAD LUCK, NO PRIZES."
265 POSITION 2,20
270 ? "TATTSLotto SCAN COMPLETE."
280 REM 0 FLAG=END OF NUMBERS
290 REM -1 FLAG=END OF DATA
295 REM EXAMPLES OF DATA LINES
300 REM DATA: NAME, NUMBERS & FLAG
301 DATA YOUR COMPUTER SYD,6,7,19,20,21,30,33,0
302 DATA SMITH FAMILY,6,12,16,17,29,35,39,40,0
303 DATA WORK SYS 10,10,5,7,12,22,25,26,30,33,39,40,0
304 DATA BOB & ANDREW SYS 9,9,1,3,5,8,11,14,25,27,38,0
305 DATA LES BELL,6,23,24,27,30,31,33,-1

```

ATARI

Tattscan for Atari.

By Paul Scofield

Tattscan is a program that will scan your Tattslotto numbers and print on the screen any divisional prizes won, who's numbers they are and the winning square.

The numbers as drawn are entered in lines 70 to 100 and the read statement in line 130

checks the numbers on record in the data lines at the end of the program.

The data lines contain the owner of the numbers, the number of numbers (this allows system games), the numbers to be checked and a flag. The flag indicates the end of numbers or end of data. The numbers are those in a single square.

BBC MODEL B

'LIFE' Simulation for BBC Micro Computer.

By G. Armitage, Laror Vic.
 'LIFE' SIMULATES the growth and death cycles of a colony of cells, here represented on a 16 by 16 grid. It was invented in 1970 by John Conway.

As it stands the program will only run on a BBC with 32K. If you have a 16K machine then all references to addresses starting with "&7..." should be changed to "&3..."

For those with other 6502 machines:

JSR&FFEE is the "print the character in A" routine.

JSR&FFE7 sends a linefeed and carriage return to the VDU.

Just a general note: ?(A)=B is the same as POKE A,B on other machines. B=?A) is the same as B=PEEK(A).

BBC MODEL B

```

10 REM LIFE / Life simulation game
11 REM (C) G J ARMITAGE 1982
13 REM VERSION 1.0 / 6-11-82
14 REM for BBC computer
110*FX14,6
120*FX4,1
130MODE7
140HIMEM=&7000
150FORI=0 TO2 STEP2
160P%=&7009
170!OPT I
180LDX#0
190.LOOP
200LDA&7B00,X
210STA&7A00,X
220DEX
230BNE LOOP
240LDX#0
250.NCELL:TXA:PHA
260LDY#9
270LBA#0:STA&7000
280.NDIS
290DEY:BEQ DONE:TXA
300CLC:ADC&7000,Y
310TAX
320LDA&7A00,X
330CMP#79
340BNE NDIS
350INC&7000
360JMP NDIS
370.DONE:PLA:TAX
380LDA&7000
390CMP#2:BCC DEAD
400CMP#4:BCS DEAD
410CMP#3:BEQ ALIVE
420JMP NEX
430.DEAD:LDA#46
440STA&7B00,X:JMP NEX
450.ALIVE:LDA#79
460STA&7B00,X
470.NEX
480DEX:BNE NCELL
490RTS
500.SCREEN:LDX#0:.NEXL:LDY#16:.NEXC:LDA&7B00,X:
JSR&FEE:INX:BEQ DNE:DEY:BNE NE XC
510JSR&FFE7:JMPNEXL
520.DNE:RTS
530
540NEXTI
550FORI=0 TO 7:READ D:?(27001+I)=D:NEXTI
560DATA 1,1,14,2,14,1,1,-17
570FOR I=&7B00 TO&7BFF
580?I=46
590NEXT
600CLS:CALL SCREEN
605PROCinit
607VDU23,1,1,0;0;0;0
610X=7
620Y=7
630PRINTTAB(X,Y);:K$=GET$
640IFK$="R" GOTO720
645IFK$="C" GOTO570
650IF K$=CHR$(138) AND Y<15 Y=Y+1
660IF K$=CHR$(139) AND Y>0 Y=Y-1
670IF K$=CHR$(137) AND X<15 X=X+1
680IF K$=CHR$(136) AND X>0 X=X-1
690IF K$="N" PRINTTAB(X,Y);"O":?(&7B00+X+16*Y)=79
700IF K$="D" PRINTTAB(X,Y);"-":?(&7B00+X+16*Y)=46
710GOTO630
720 GEN=0
730CALL&7009:VDU23,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
740K$=INKEY$(0):*FX15,0
750IF K$="S" GOTO600
755IFK$="-" FOR N=1 TO200:NEXT
760PRINTTAB(0,0);:CALL SCREEN
770PRINTTAB(16,5);"GENERATION";GEN
780GEN=GEN+1
790GOTO730
800*FX4,0

```

```

810PRINTTAB(0,16);
820END
1000DEFPROCinit
1010PRINTTAB(10,17);"LIFE SIMULATION"
1020PRINTTAB(10);"By G.J.Armitage 1982"
1030PRINT"Use the cursor keys to move the cursor."
1040PRINT"N) New cell D) Delete cell"
1050PRINT"R) Run generation S) Stop generation"
1060PRINT"C) Clear array."
1070PRINTTAB(19,6);"5 5w!w!"
1080PRINTTAB(19,7);"u055 u0"
1100ENDPROC
1200 REM

```

CP/M

Quickdraw for CP/M Systems.

By Paul Bachelor

There are not many programs readily available which use the full capabilities of cardreader-enhanced microcomputer system.

This was highlighted in Textfile and Brian Fowler's 'Classroom Computers' (Aug '82). This program uses an existing random access file of names, produced by another short program. Most schools and colleges would probably have an existing name file.

Each of these programs has an extensive card check routine to enable quick fixing of poorly marked cards.

The listed program is smaller but very useful in schools or sports organisations where competition draws are frequently required. It will produce any number of copies of a draw for any number of rounds for any number of teams/players. It was written in Microsoft BASIC V5.2 for a CP/M system, but with a few alterations could run on an Apple/TRS-80 or any system with reasonable memory (8K-16K, depending on the

length of the draw) and, hopefully, a printer.

For odd numbers of teams the sort is fairly straightforward and rotates all teams. The last team of any round has the bye. For even numbers of teams the teams are rotated about the last team and then this team's match is shuffled through the draw.

The program ensures that teams alternate for home and away matches.

The VDU output section is straightforward, but the printer output has the flexibility of printing a determined number of rounds across a page (M) depending on the character width of the page (W) and the maximum print width of each round (P).

If required, the date or other heading may be placed at the top of each round or every second round, say, if two rounds can be played on the same date.

Anyone interested in copies of this or the card processing programs could write to Paul Bachelor, 13 Collier St, Echuca Vic.

QUIKDRAW - SAMPLE RUN (W=80) 23/9/82

1. Apples	2. Bombers	
3. Cats	4. Demons	
5. Emus		
 Round 1	Round 2	Round 3
1 Apples v. Demons	1 Demons v. Cats	1 Cats v. Apples
2 Bombers v. Cats	2 Emus v. Bombers	2 Demons v. Emus
Emus -Bye.	Apples -Bye.	Bombers -Bye.
 Round 4	Round 5	Round 6
1 Apples v. Emus	1 Emus v. Cats	1 Cats v. Bombers
2 Bombers v. Demons	2 Apples v. Bombers	2 Demons v. Apples
Cats -Bye.	Demons -Bye.	Emus -Bye.
 Round 7	Round 8	Round 9
1 Bombers v. Emus	1 Emus v. Demons	1 Demons v. Bombers
2 Cats v. Demons	2 Apples v. Cats	2 Emus v. Apples
Apples -Bye.	Bombers -Bye.	Cats -Bye.
 Round 10	Round 11	Round 12
1 Bombers v. Apples	1 Apples v. Demons	1 Demons v. Cats
2 Cats v. Emus	2 Bombers v. Cats	2 Emus v. Bombers
Demons -Bye.	Emus -Bye.	Apples -Bye.

quikdraw-pb-ets-23/9/82

```

10 CS$=CHR$(27)+"v" :PRINT CS$;TAB(20)*QUIKDRAW
20 PRINT " THIS PROGRAM WILL PRODUCE A DRAW FOR ANY NUMBER OF TEAMS
30 PRINT
40 PRINT " FOR ANY NUMBER OF ROUNDS, USEFUL FOR SPORTS ETC.
50 , Paul Bachelor 7/82
60 PRINT ****
70 PRINT "Please enter the date "; :INPUT D$ :PRINT
80 INPUT "No. of teams ";T :PRINT
90 IF T<2 THEN PRINT "You've got to be kidding, try 'Solitaire' !!";END
100 INPUT "No. of rounds ";N :PRINT
110 D$=TS(T+1),A(N,T)+1,D$(N,T),D$(N)
120 PRINT "Type in team/player names, one at a time."
130 PRINT :PRINT "If names are too long use abbrev. or your draw will be too
spread out."
140 FOR K=1 TO T
150 PRINT "Team No. ";K;
160 INPUT TS(K)
170 IF P<LEN(TS(K)) THEN P=LEN(TS(K))
180 NEXT K :PRINT
190 , Set the length of team names equal
200 FOR D=1 TO T
210 TS(D)=TS(D)+SPACES(P-LEN(TS(D)))
220 NEXT D
230 Set the number of rounds printed across the page
235 T$=PRINT "Width of print page ";W :PRINT
240 :PRINT "Please stand by !";:PRINT
245 P=2#P+10
250 ,
260 , Routine for rotating teams
270 FOR R=1 TO N
280 FOR K=1 TO (2*CINT(T/2))-1
290 IF R=1 THEN A(1,K)=K :GOTO 310
300 A(R,K-1)=A(R-1,K)
310 NEXT K
320 IF NOT(T MOD 2) THEN A(R,T)=T
330 IF R>1 THEN A(R,K-1)=A(R,0)
340 NFEXT R
350 , home away swaps
360 FOR R=1 TO N
370 FOR L=1 TO INT(T/2)
380 S=2*INT(T/2)+1-L
390 IF (R-1) MOD 2 THEN SWAP A(R,L),A(R,S)
400 D$(R,L)=TS(A(R,L))+". v. "+TS(A(R,S))
410 NEXT L
420 IF T MOD 2 THEN D$(R,L)=" "+TS(A(R,T))+". -Bye.";:GOTO 450
430 S=INT((R-1) MOD T/2)+1
440 IF S>1 THEN SWAP D$(R,1),D$(R,S)
450 IF (R-1) MOD 2 THEN SWAP D$(R,1),D$(R,INT(T/2))
460 NFEXT R :IF (T-1) MOD 2 THEN L=L-1
470 PRINT CS$+" Sorted OK ---"
480 ,
490 , Initializing output
500 ,
510 PRINT :PRINT "Type in a heading for the draw ";:PRINT
520 LINE INPUT HS :PRINT
530 INPUT "Is there a time or date for each round ";R$ :PRINT
540 IF LEFT$(R$,1)<>"Y" THEN 600
550 PRINT "Type in one at a time ";:PRINT
560 FOR R=1 TO N
570 PRINT "Round ";R; :INPUT " ",D$(R)
580 IF P<12+LEN(D$(R)) THEN P=12+LEN(D$(R))
590 NEXT R
600 PRINT :PRINT
610 PRINT "Do you want the draw printed on the VDU?"

```

or on the Line printer (U/L) " ;R\$

```

620 INPUT "
630 IF LEFT$(R$,1)="L" THEN 760
640 ,
650 , Routine for printing on the screen
660 FOR R=1 TO N
670 PRINT "Round ";R; " ";D$(R)
680 FOR K=1 TO INT(T/2)
690 PRINT K; ". ";D$(R,K)
700 NEXT K
710 PRINT " ";D$(R,K)
720 NEXT R
730 PRINT :PRINT "Do you want a printout (Y/N) "; :INPUT RS
740 IF LEFT$(RS,1)<>"Y" THEN END
750 ,
760 , Routine for printing across the page
770 PRINT :INPUT "How many copies are required ";C$P
780 PRINT :PRINT "## PRINTING ##"
790 FOR C=1 TO CP :PRINT C,
800 LPRINT CHR$(12)+CHR$(14);TAB(INT(W/15))HS+SPACES(5)+D$AS
810 LPRINT :LPRINT :LPRINT STRING$(W,45)
820 FOR I=1 TO T STEP 2
830 LPRINT " ";TAB(INT(W/4))USING "###";I; :LPRINT ". ";TS(I);
835 IF (I+1)>T THEN 845
840 LPRINT TAB(INT(W/4)+P/2+5)USING "###";I+1; :LPRINT ". ";TS(I+1);
845 LPRINT TAB(W)+""
850 NEXT I :LPRINT " ";TAB(W)" " :LPRINT " ";TAB(W)" "
855 M=INT(W/P)
860 FOR R=1 TO N :LPRINT " ";
870 IF (N-R+1)<M THEN M=N-R+1 :P=P+2
880 FOR I=1 TO M
890 LPRINT TAB((I-1)*P+3) Round ";R; " "+D$(R);
900 R=R+1
910 NEXT I
920 LPRINT TAB(W)+""
930 R=R-M
940 FOR K=1 TO L :LPRINT " ";
950 FOR I=1 TO M
960 IF (T MOD 2) AND K=L THEN LPRINT TAB((I-1)*P+3)D$(R,K);
970 :GOTO 980
980 R=R+1
990 NEXT I
1000 LPRINT TAB(W)+""
1010 R=R-M
1020 NEXT K :LPRINT " ";TAB(W)" " :LPRINT " ";TAB(W)" "
1030 R=R+M-1
1040 NEXT R :LPRINT " ";TAB(W-35)*quikdraw-pb-ets-";D$;TAB(W)" "
1050 LPRINT STRING$(W,45)
1060 NEXT C :PRINT :PRINT "Completed !"
1070 PEND :END
1080 LIST OF VARIABLES
1090 T - no. of teams K - counter for teams
      N - no. of rounds R - counter for rounds
      P - max.length of team names and width of round
      M - no. of rounds/page W - width of printer page
1100 C,CNP - no. of copies required
      TS(K) - team names array
      AS(R,K) - team numbers for rotating teams
      DS(R,K) - competing teams per round
      D$(R) - date per round
      D$AS - date of draw
      L - no. of lines printed/round
      (T/2 - for even T, [T+1]/2 for odd T)
      CS$ - code for clear screen

```

MICROBEE

FROGGER is modelled after the popular game of the same name. Your frog is in a real predicament. He must firstly hop over a four lane highway, dodging cars and trucks. If he survives, he must then negotiate the flooded river, jumping from log to log until he arrives safely home. **FROGGER** is a real favourite with children because it is easy to learn but takes ages to master. **\$17.50**

BACKGAMMON plays the game of the same name on your MicroBee! The game conforms exactly to that set down in the Official Rules of the International Backgammon Association, including rules of doubling and scoring. Playing BACKGAMMON on a board is a thing of the past! **\$17.50**

ASTEROIDS PLUS is the finest high resolution graphic arcade game available for the MicroBee computer. It features spinning 3-D point by point resolution graphics, shields, intelligent beings, guided missiles, black holes, high-score board and breathtaking sound effects. ASTEROIDS PLUS took more than 1,000 man hours to write and cost in excess of 20,000 to develop. You owe it to yourself to experience the best in arcade games on your MicroBee. ASTEROIDS must be the best hi-res graphic arcade game on the market for the Bee. Your Computer, Hybe, 1983. **\$22.50**

KILOPEDE & GHOST MUNCHER come on the one cassette together! KILOPEDE is the very popular ATARI 'CENTEPEDE' game and GHOST MUNCHER is our version of PAC MAN. These two hi-res arcade style games are great value. **\$17.50**

METEOR RESCUE is a high speed graphics arcade game. The mission is to shuttle earthlings from the planet surface to the mother ship without colliding with meteors and other spinning 3-D objects. The game increases in difficulty as the score rises. **\$17.50**

DEFENDER needs no introduction. The DEFENDER arcade game is one of the most popular ever produced and we expect that our MicroBee version will be the same. **\$22.50**

BEEZ80 is far from your average run-of-the-mill disassembler! Other than being a mere 4K long, able to disassemble at the speed of light and packed with options, BEEZ80 will display before your very eyes all those unknown instructions ZILOG never talk about! **\$20**

BASIC TUTORIAL is a super teaching aid for any classroom. BSIC TUTORIAL is a set of nine interactive exercises designed for teaching Basic to the computer novice. No previous knowledge is assumed.

BASIC TUTORIAL uses a unique double screen technique to display both the normal computer output and the tutorial exercises at the one time. This allows the student to use the MicroBee in the normal way, while the tutorial instructions appear in the lower half of the screen. To learn to drive a car, a student must get in and drive. Reading theory books help, but the real learning comes by driving. The same applies to computing. Books are no substitute for experience. These computer run tutorial exercises teach computing better than any other form of instruction. **\$20**

MusicB is a composer/editor program for the serious music maker. MusicB takes over where COMPOSER BEE finishes. MusicB has enormous flexibility, range, tone adjustment and is essentially a mini music language. Even complex sound effects can be produced! MusicB makes chopsticks of the BASIC PLAY command. **\$20**

DIGITALALKER is a Computer Voice Storage & Retrieval System. Give your MicroBee a Voice! DIGITALALKER allows the MicroBee user to store his voice in the computer as digital data which may be played back at some later time.

Simply load the DIGITALALKER software, plus the DIGITALALKER hardware into the I/O PORT and connect the DIGITALALKER lead to the EAR plug of your tape recorder.

Once the voice has been recorded, it may be played back immediately or stored on cassette. The digitized voice may easily be incorporated into the users own programs without detailed knowledge of machine code. The DIGITALALKER hardware is not required in order to play back the voice. Thus any MicroBee user may play back a voice previously recorded with DIGITALALKER! **\$55**

TO ORDER TURN TO PAGE 82.

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ANZ



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Delivery will be by freight to anywhere in Australia, fully insured. Shipments will be made ex-stock, but to cover unforeseen delays, please allow up to 4-6 weeks for delivery. This offer is made by Pacesetter Systems (a division of VSI Electronics Pty Ltd, incorporated in S.A.) and ETI is acting as a clearing house for orders. All orders must be via the coupon here, or a photostat thereof if you don't wish to cut the magazine.



TI 810 PRINTER

\$1410 exc. tax

\$1692 inc. tax

Normal list price on this printer
is \$1890 exc. tax; save \$480!

TI 810 PRINTER

The Texas Instruments *Omni* 800 Model 810 printer is a receive-only, forms-programmable, impact printer. It features a microprocessor system which controls all character recognition, printing, and paper movement. Basic operating, data processing and self-test routines for the microprocessor system are stored in ROM. Random-access memory stores vertical format control routines which may be locally programmed by the operator or remotely programmed through the communications line.

A single seven-dot-column printhead produces the 9 x 7 dot matrix for character generation. Printing is bidirectional at the rate of 150 characters per second. A full 132-character line is printed in less than one second.

The standard print format is 10 characters per inch (cpi) horizontally and six or eight lines per inch (lpi) vertically. The printer produces one original and up to five copies using sprocket-fed paper in widths from 76.2 to 381 mm (3" to 15").

A detailed, comprehensive, A4 format 76-page manual is included.

There's nothing flash about the Texas Instruments 810 printer — but it's an ideal printer. It prints quickly and cleanly, and it's as close to unbreakable as we've seen. We run three of them in this office — one has been on line for more than a year without missing a beat. It literally never gets switched off, and runs up to 24 hours a day, all the time.

When we want to move cables in the ceiling, we stand on the printer to get to them! Most printers these days would collapse as soon as you even thought of doing such a thing.

The TI 810 is recognised throughout the industry as a reliable, fast workhorse. It's claimed to run at 150 characters a second, and it comes closer to its rating than anything else we've tested. On a solid-text printing test that shows 80 cps machines are actually running at around 34 cps, the 810 comes up just under 130. That's fast.

Its dot-matrix typeface is obviously draft quality, without full descenders, but it is clear and readable. If speed and real bulletproof reliability are what you need, this is the machine.

Normal retail price is around \$2200 before tax, and it is good value even at this price.

SPECIFICATIONS TI 810 PRINTER

TI 810 PRINTER		PAPER	COMMUNICATIONS
PRINTER			
Technique	Seven-wire matrix, impact dot matrix	Paper width	Serial (EIA RS-232-C)
Character matrix	9 x 7 (9 wide, 7 high)	Paper loading	110, 150, 300, 1200, 2400.
Character set	64-character limited ASCII	Number of copies	4800, 9600
Characters per inch	10		ODD, EVEN or ignore
Characters per line	132 maximum	CONTROL SYSTEM	
Lines per inch	6 or 8 (operator — or software — selectable)	Electronics	8080 microprocessor system
THROUGHPUT		Printing method	Bi-directional
Print speed	150 characters per second	Buffer (FIFO)	256 characters
Lines per minute	64 at 132 characters per line, and up to 450 at 10 characters per line	Horizontal tabs	Software Programmable
Line feed	33 milliseconds	Vertical format control	Software and operator programmable
Paper slew	170 mm per second (6.67 inches per second)	Self-test	Prints ASCII characters in a rotating pattern (barberpole)
		Bell	Pulsing audible tone
			PHYSICAL DIMENSIONS
			Weight
			25 kg (55 pounds)
			Height
			203 mm (8 inches)
			Width
			654 mm (25.75 inches)
			Depth
			508 mm (20 inches)

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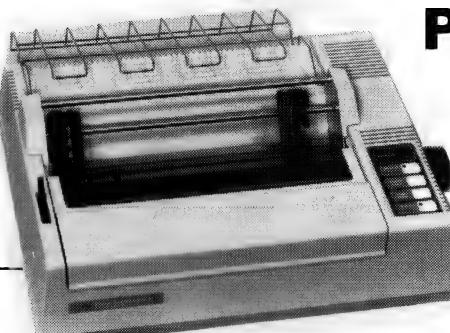
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TI 850 PRINTER

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It comes with a parallel interface as standard, but a serial option is obtainable. There is a 256-character buffer inside and a 400-character buffer option is offered, too. The 850 can handle single sheets of paper or fanfold paper up to 254 mm (10") wide and roll paper up to 127 mm (5") in diameter. A comprehensive, copiously-illustrated, 108-page manual is supplied with the printer.

SAMPLE PRINTOUTS

This is an example of ENHANCED print made by the Model 850 Printer.

This is an example EMPHASIZED print This is an example of STANDARD print made by the Model 850 Printer. made by the Model 850 Printer.

This is an example of COMPRESSED print made by the Model 850 Printer.

The Model 850 Printer made this example of DOUBLE-WIDE print.

SPECIFICATIONS TI 850 PRINTER

TI 850 SPECIFICATIONS		Serial Interface Specification	Characters per line	
POWER REQUIREMENTS	Voltage	EIA RS-232-C standard subset	80 characters at 10 cpi (standard); 132 characters at 16 cpi	
	90-132 Vac. 47-63 Hz. single phase or 187-264 Vac. 47-63 Hz. single phase	Line levels Type code	Full line at 10 cpi or 16 cpi requires 203 mm (8")	
Power	100 W maximum	12 or -12 Vdc ASCII and similar international codes	6 ipi and 8 ipi	
PHYSICAL DIMENSIONS	Size	Bits per second	Friction-roller or tractor	
	412 mm (16 2") wide 220 mm (13 0") deep 127 mm (5.0") high	200, 300, 600, 1200, 2400. 4800, 9600	76 mm to 254 mm (3 to 10 in)	
Weight	6.8 kg (15lb) excluding options and accessories	Receive buffer	LINES PER INCH	
CHARACTER SETS	Type	256 characters, expandable to 4000 characters Printer ready busy	PAPER Type	
	FULL US ASCII and 7 international	Line control	Width	Sheet, roll or fanfold (single or multipart)
INDICATORS	Light DATA	PRINTER Method	Roll	254 mm (10in) maximum
	Power, on-line, pitch SFL	Speed	Thickness	127 mm (5.0 in), maximum diameter
Parallel Interface:	Line levels: Characters per second Line control	Pattern		Single part 0.254 mm (0.01 in)
	0 or +5 Vdc 1000 cps maximum Strobe acknowledge	Characters per inch		Multipart 0.34 mm (0.014 in) maximum for original plus two copies (No cards permitted except on last copy)
		10 cpi and 16 cpi (standard) 5 cpi and 8 cpi (double-wide)		

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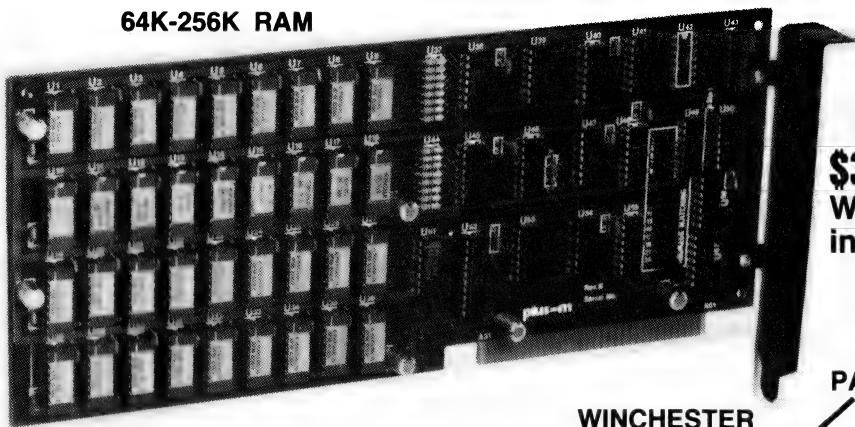
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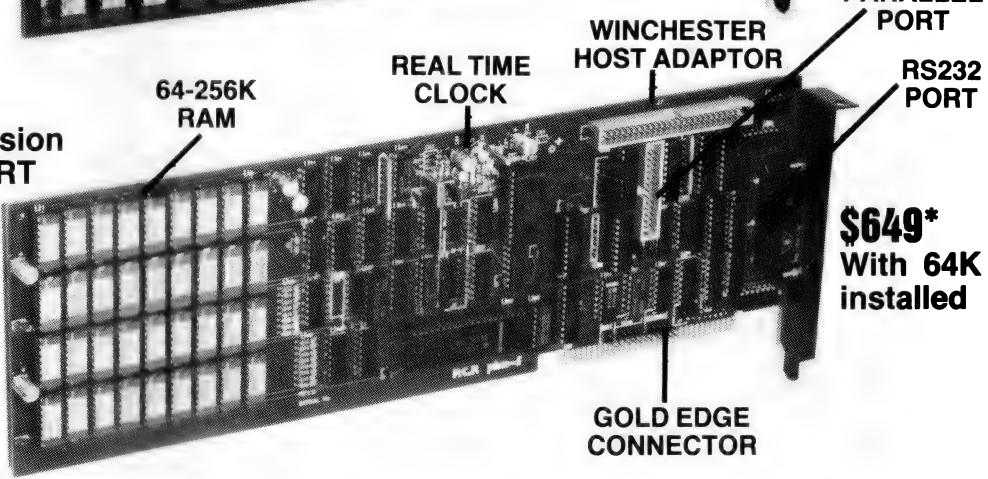
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The Tenth Australian Computer Conference

Fresh from a fortnight in Melbourne ("Did I deserve that?"), Les Bell recounts his impressions of the Tenth Australian Computer Conference and Exhibition.

WITHOUT A DOUBT, 10ACC was the biggest event of its kind in Australia since the IFIPS Exhibition of 1980, which Melbourne co-hosted with Tokyo. It was such a huge event, in fact, that it was impossible to take it all in – there were five streams of seminars and a huge exhibition to cover.

This wasn't helped by the activities in Newport, Rhode Island, which probably caused disruption to the activities of many of the delegates. In my case, it meant a sleepless night which reduced the following couple of days to a virtual blur. (*That's your story, Bell... – MW.*)

Nonetheless, some impressions do stick out, so for those of you who couldn't get there, here's a brief summary.

Entertaining Presentations

The papers presented at the conference covered a wide range of topics, from a micro-based advertising agency system to Zipf's Law – structured programming and creativity.

One of the most entertaining presentations was on the night of the Conference dinner, when the guest speaker was F. Werner Bittelmann, newly appointed Executive Director of AFIPS, on the topic 'Plugging It All In: The Computer Community and the Future'. After the shock opening when he revealed that he was, in fact, a member of the New York Yacht Club, he continued by commenting that of course our win would not have been possible without high technology in the form of computers.

"I don't know what kind of computers your crew had," he said, "but ours were obviously saddled with IBM!" His talk

continued in this vein, lambasting virtually every company and institution in the computer community, until the final denouement, when it was revealed that Mr Bittelmann was actually well-known public speaker Campbell McComas in disguise.

Laser Spectacular

The mainstream of activities started with the opening ceremony, which was quite a spectacle, combining a laser light show and audio-visual presentation. The most important part of the ceremony, however, was the official opening by Bob Hawke, in a speech which really gave little away in the form of government support for high technology industries.

Mr Hawke spoke of the Government's moves to encourage a venture capital market in Australia, which it is hoped will make \$40 million of capital available. He also confirmed that the federal government will provide \$18 million over the next three years to introduce a computer education program for secondary schools. While these are moves in the right direction, the general feeling is that there is a long way to go.

The keynote speaker, Philip Hughes, who is chairman of Logica in the UK, spoke of the British experience in implementing a national policy for the information technology industries. The results of the UK's attempts at direct government investment in hi-tech industries have been mixed, and indeed it is difficult to draw any clear conclusion about the success or otherwise of government policies. What is clear is that policies are needed.

For the remainder of the conference I split my time between the lecture sessions and the exhibition. It was impossible to attend even one quarter of the sessions, and so it would not be fair to single out only a few sessions for praise. However, I did attend an excellent update seminar on office automation – Professor Phil Grouse's seminar on his

Flowguide project (virtually a graphical program design system), which is nearing completion – and an interesting session on local area network chips from Intel, among others. I'm still trying to read through the two volumes of papers, and we may even reprint some of the best in the magazine.

Hard On The Feet

The exhibition was absolutely huge and did some severe damage to the soles of my feet. However, there were lots of interesting things to see.

Imagineering demonstrated the Star series of software as well as the Visi series. Most importantly, they showed the VisiOn system, which links together spreadsheet, graphics and list management software to form an integrated system rather similar in concept to the Lisa workstation. Not only is VisiOn able to transfer information between files, it is also able to reformat the data as it goes, allowing graphs to be integrated into text documents, for example.

Imagineering also released the Davong line of mass storage devices, which operate on Apple, IBM-PC and Osborne computers. The range includes 5, 10 and 15 Mbyte Winchester disks, disk cartridges and streaming tape devices. They also support a multiple operating system which allows the user to switch from PC-DOS to UCSD p-system or CP/M-86.

Hewlett-Packard used 10ACC to release two new laser printers, the 2687A desktop printer and the 268A text and graphics printer. Each prints at 12 pages per minute with a resolution of 300 dots per inch, and they are quieter than conventional printers.

HP brought out David Townsend, Marketing Manager of the UK-based Office Productivity Division, which generates software for the HP3000 and HP's smaller computers. While he was in Australia, HP took the opportunity to release a range of office automation products, including enhancements to their ►

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electronic mail system, networking software for the HP 120 and 125 called HP Desk Link, HP List Keeper, a list management package for the HP3000, and Easy chart, an enhanced user-friendly graphics package for the HP3000.

Most significant, perhaps, is Desk Manager, an integrated mail, word processing and calendar/diary package that runs on the HP3000 and is available to any HP workstation or terminal – or indeed any device – which can log onto the HP3000.

As an example of the impact of office automation, Townsend described their UK 'software factory', which employs 90 professionals and only four secretaries.

Stars Of The Show

One of the stars of the show was the Gavilan portable computer, displayed by Electronic Concepts. This amazing little device uses a high-resolution liquid crystal display to provide a user interface similar to the Apple Lisa; below the screen is a touch panel which replaces the mouse and allows the user to point to objects on the screen.

The 4 kg package includes a full-sized keyboard, 8088 processor, eight-line by 80-character display, 80 Kbytes (expandable to 336 Kbytes) of CMOS low-power memory, a 9 cm (3.5 inch) floppy disk with 320 Kbytes capacity, video interface and 300 baud modem. Standard software, built into the system's ROM, includes an operating system kernel, interpreter, and human interface software. Applications software, on ROM or disk, includes word processing, spreadsheet calc, list manager and mail system.

In addition, the Gavilan will run MS-DOS and all the associated software. Gavilan is headed by a number of

former Zilog and Magnuson executives. In Australia the machine will sell for \$5750 plus tax.

Insystems demonstrated their latest product, the Stearns personal computer. This IBM-compatible machine uses an 8086 processor running at 8 MHz to return a significant performance improvement and is networkable. They only just had the first one in the country, and weren't too *au fait* with it yet, but it looks like an interesting machine.

I had an interesting session with Gil Simpson, a consultant for Burroughs, who developed their fourth-generation language, LINC. "Data processing lives a lie," said Simpson. "It promises a lot, and delivers little."

Simpson first developed the concepts behind LINC while working in Saudi Arabia; it developed out of his intense dissatisfaction and frustration with the current way of doing things. Returning to New Zealand, he teamed up with Peter Hoskins to work on their new system, which uses a non-procedural approach to reporting of transactions at various levels of a company.

Interestingly, in the light of developments in the micro world, LINC was written in COBOL rather than a systems language. The development was done at a low cost, with direct costs of under \$250,000. The system has achieved great success, with over 700 users contracted to use the system. A Kanji version was released in Japan in June, and already 22 systems are installed there.

Over To The Heavies

Rakon Computers displayed the Sage, a 68000-based machine which runs the UCSD p-system operating system. This provides access to Pascal, FORTRAN and BASIC languages, word

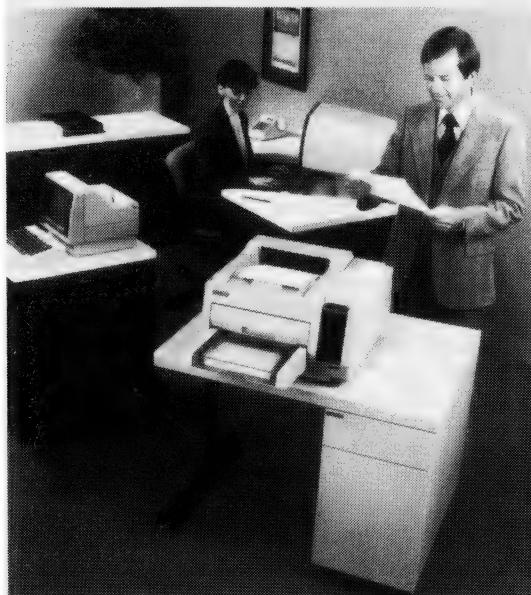
processing and spreadsheet, and the system is also supplied with a multi-user operating system. The Sage is highly regarded amongst Pascal devotees, and is also attracting attention as an ideal machine for running Modula 2, Nicklaus Wirth's latest language. With prices starting under \$5000, the Sage is a very attractive proposition.

Next door to Rakon was another of the 16-bit heavies from the US, Fortune Systems. The Fortune has received rave reviews overseas, particularly for its word processing software, which is modelled on Wang's, the benchmark of the industry.

The Fortune runs a port of UNIX V7, and supports BASIC, C, CBASIC 16, Level II COBOL, APL and other languages, as well as a host of application packages. The company has reportedly suffered setbacks in the US, where several of the founders resigned; however, I hear a rumour that AT&T is likely to buy a large quantity of Fortunes for use as workstations around their own UNIX-based system, and that should improve Fortune's fortunes (ouch).

NEC Information Systems Australia exhibited the APC, of course, as well as their larger Astra series of minicomputers. Of particular interest were a graphics tablet hooked to the APC and a colour printer (Bill Bolton had it set up to print posters of Australia II and the boxing kangaroo), and a voice input system for the Astra series. If you were wondering where the amazing graphic printouts on this month's cover came from – that's an example of what the APC plus graphics tablet and colour printer can do. We'll be reviewing this combination early next year.

As IBM-PC compatibles continue to flourish, who should enter the market



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but AWA, with the Corona. Two models are available: a desktop PC-1 and portable PPC-1, with identical specs. Both have a serial port and other functions on the main board, and four expansion slots. They come with MultiMate word processing, PC Tutor, MS-DOS and GW-BASIC as standard.

Philips had an impressive pyramidal display showing how word processors can be linked to computers, which can be linked via radio to in-car terminals, to local area networks, to the telephone network. Basically, Philips can link just about anything to anything, with the ultimate intention of linking everything in a company together.

On the BBJ Computer Shop stand, Tony Cookes showed us the Peake Software accounting system for the Sirius (and IBM and NEC and HP 150 and others). The Sirius version is particularly interesting as it has a built-in graphics module which can be used to display incomes or expenses as bar charts, pie charts, and so on. The system incorporates GL, debtors, creditors, stock and invoicing, cash book, payroll and job costing.

Pennywise Peripherals displayed their new system, which is based upon multiple Motorola 6809 processors operating under the FLEX9 operating system. For multi-user applications, the OS9 or UNIFLEX operating systems are supported. Each of the peripheral boards on the system bus has its own processor, giving a much higher performance than would otherwise be possible. A variety of peripherals is available, including 13 cm and 20 cm disks, a hard disk and serial and parallel printer interfaces.

Toshiba showed the DF-2100R document filing system, which is based on an optical disk. This can store up to 10,000

pages per side of a disk, and can retrieve any document within ten seconds. It works with any kind of documents, including handwriting and drawings. Documents can be printed out using a thermal printer which is rather like a fax machine.

More PC Lookalikes

Another IBM-PC compatible was demonstrated by Computhink Australia. Unfortunately, it was late on the last day when I heard about the machine, and I couldn't find Computhink's stand in time to see the Sigma Designs machine. However, the machine sounds interesting and Computhink says the pricing should be attractive.

The President's men were busy right through the show. The President dealer breakfast was the occasion for the launch of the Dulmont Magnum, which looks fair set for success. The President stand had several Magni (?) which were perpetually surrounded by interested visitors.

Also at 10ACC was Darlene Kindstrand, International Sales Co-ordinator for Kaypro. Darlene brought details of a number of upgrades and enhancements for the Kaypro range of computers, including a new local area network facility for the Kaypro, jointly developed by Kaypro and Centram Systems, originators of the Web network. The high-speed (125 Kbit/s) CSMA/CD network can be added to a Kaypro for just \$US195.

Wicat released a new top-end system, the 220, at 10ACC. This new beast will support up to 64 terminals, 12 Mbytes of main memory, mag tape back-up and up to 3.8 Gbytes of disk. The question is, is this a micro? It's based on an 8 MHz 68000 all right, so it must be. Inci-

dently, I tip Wicat to introduce a new line of products early next year.

Apple Computer timed an announcement of a price drop on the Lisa to coincide with 10ACC. By unbundling the applications software from the hardware, the company will be offering the basic hardware for \$8595. A complete system of Lisa, six applications packages, dot matrix printer and interface card is now \$10,395.

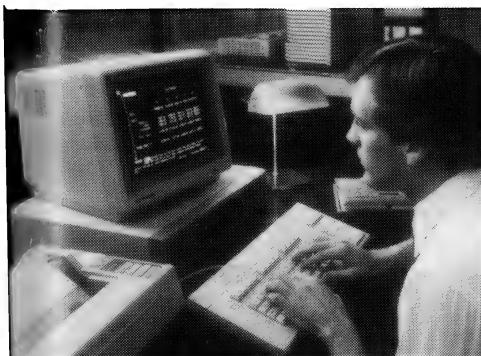
Apple also showed its new colour plotter, which is priced at \$1295 and features four colour pens.

Sigma Data displayed the Convergent Technologies MegaFrame, a multiprocessor minicomputer replacement based on the Motorola MC68000. On their stand, they had an eight-user system supporting a cluster of workstations along with asynchronous terminals. The system can expand to a 128-user system operating at 8 MIPS, and supports a wide range of mainframe communications protocols.

Sigma recently used Convergent workstations in the installation of one of Australia's first X.25 Austpac networks in Perth.

Texas Instruments released its new Professional Computer, which is actually an IBM-PC clone, but with some added tricks of its own. TI is counting on its expertise in the speech recognition field, and has announced support for speech command input as well as a telephone interface, although Telecom's reaction to that should be interesting.

In addition, TI is working on a natural language interface database management system which looks all but foolproof. It is well along the track, and TI provided convincing demonstrations of both these systems to the press. □



Far left: HP's non-impact printers, capable of quality printing at 12 pages per minute. Left: A microprocessor-based device reads aloud to a blind listener — one of the slides from 10ACC's opening audio-visual extravaganza. Right: Texas Instruments' Professional Computer, released at 10ACC. Far right: Data General's office automation package, Comprehensive Electronic Office, being demonstrated at 10ACC.



A Tale of 3 Modems

At last! We've been promising a definitive article on modems for a while now, and here it finally is. Bill Bolton slaved over a hot phone line for months to produce this review of three recently released modems - so get your teeth into it now.

As many of you are aware, not least the manufacturers of the modems reviewed here, this review has been a long time coming. Some of these products have been around for over six months, so why the delay? Well, thereby hangs a tale!

The first modem review I did for *Your Computer*, a year ago now, was done quite quickly. The whole review was finished in about three weeks. That modem, which was a random sample from a batch of six, ran fine for the test period and for several weeks afterwards. Then the problems started.

One by one the six *Your Computer* modems started to fail. The manufacturer fixed them and they ran OK for a while again ... and failed. This cycle was repeated several times until finally they were fixed properly; they have now been running reliably for several months and the problems seem behind us.

When further direct-connect modems started to appear on the market, *Your Computer* was approached by the manufacturers to review them. Rather than run the risk of repeating the experience of the previous modem review, this time I decided a long-term test of the modems was required. So the three modems reviewed here have been regularly used by various *Your Computer* staff and authors for several months.

To Compare Or Not Compare

The next issue for me was to decide whether to handle the reviews separately for each product or do some sort of combined review. Two of the modems are directly competitive, while the other is a little downmarket. To further confuse the issue, the two competitive units have both been subject to specification upgrades due to feedback from this reviewer and from other users.

After tossing this issue around amongst a few of the YC authors I finally decided an all-in-one review would be the best approach.

Some Background

All three of the modems are based on IC modem 'chips'. As the chip does most of the really difficult stuff in terms of modulating and demodulating the data, there isn't really much to go wrong with stability and so on. As two of the modems use an identical chip, it's not surprising there is little difference in their purely technical performance.

A Standard For Comparison

The real difference between the modems is in terms of functionality, and it is this aspect of the modems I've paid most attention to.

I needed a standard for comparison of the three modems, and finally selected a common Telecom-supplied 300 bps modem, the GEC DM-202 as that standard. Now the DM-202 is a *big* modem, much bigger than any of the modems reviewed here, but it is the sort of modem that Telecom uses internally as a test standard and largely typifies what Telecom thinks a modem should look like. It can be configured for answer or originate modes and manual connect or automatic answer operation. The originate/answer mode can be controlled by one of the lines on the RS-232 interface. For full auto answer operation an additional set of contacts in the companion telephone are used to detect an 'on hook' condition.

With a Telecom-approved, privately supplied modem there is virtually no restriction as to what equipment you can connect to the modem. However, with modems rented from Telecom, you must have the computer equipment Telecom approved before they will let you connect it to the modem, and sometimes you must use an additional modem isolator as well. Many existing Telecom modem users would like to stop paying Telecom rental for a modem and replace it with one they can own themselves. This is particularly true of auto answer modems.

The standard for comparison became simply this:

"How well does the modem under review serve as a plug-in replacement for a Telecom 300 bps modem in a similar configuration?"

The Basis Of Review

The one remaining problem was to decide at what level to review the products. Let me say at this stage that they

are all good products which work well and perform the tasks they were designed to do.

I could take you through a detailed description of each one from the notes I made while using them, telling you what all the buttons do and so on, but the more I think about it, the less relevant that appears.

This review has only a brief description of the products; if you want more details ask the manufacturer. I'm satisfied that they are all reputable and that the modems perform as they claim they will! What I want to concentrate on in this review is how I feel about the products after having used them in their present forms for several months.

Additionally, both DataSat and Modem Technology have changed their products several times in small but significant ways while they were under review. The products you can buy from these two suppliers are now different from the ones that I had for review. Again this tends to make a blow-by-blow review less useful.

V.23 Modem Standard

As detailed below, two of the modems support 1200 bps operation but not 1200 bps *full duplex*. The only two-way service that is supported is 1200 bps with a 75 bps back channel. At least one of the suppliers is trying to stir up interest amongst microcomputer users in using this CCITT V.23 standard.

Well, it does work, but reliability is not good over the normal switched telephone network. This is *not* a fault of the modems but more a reflection of the wide variety of line conditions that can be found on the public switched telephone network.

The CCITT V.23 standard works for Telecom because it generally tries to supply good Datel lines (local loops) to its customers who rent V.23 modems. A microcomputer user trying to run at V.23 to a fixed modem connected to a Telecom Datel switched network line may be able to get away with using V.23. Some recent tests I conducted on the switched network between several locations using V.23 modems, including the two reviewed, produced very mixed results.

I cannot recommend V.23 1200 bps operation as being a generally viable option for most microcomputer users. If

it does work OK for you, well and good, but I wouldn't suggest that you buy a modem solely on the basis that it has V.23 as one of its operating standards unless you are quite sure you have a definite need for it.

Two of the modems reviewed here happen to have V.23 standard because it's 'there on the chip' and so it really adds little to the cost of the modem to implement it. I would suggest that the majority of microcomputer users should regard these modems only in the light of the 300 bps performance and ignore the V.23 standard aspects entirely.

For the purposes of this review, the operational tests on V.23 standard were done to a remote system with a Telecom modem attached to a Datel line.

The Modems

In order of presentation for review we have:

The 'World Modem' from DataSat

The 'UDM1200' from Modem Technology

The 'Cicada' from Centre Industries.

The AMD Modem IC

The AMD modem IC is used by both the World Modem and the UDM-1200, so let's take a quick look at its features. The AMD modem IC is one of the first of a growing number of modem ICs. It supports several modem standards as follows:

CCITT V.21: 300 bps full duplex.

CCITT V.23: 1200 bps half duplex with optional 75 bps back channel.

BELL 103: 300 bps full duplex.

BELL 202: 1200 bps half duplex with optional 5 bps back channel.

A 600 bps 'fallback' mode is also implicitly supported in the 1200 bps modes.

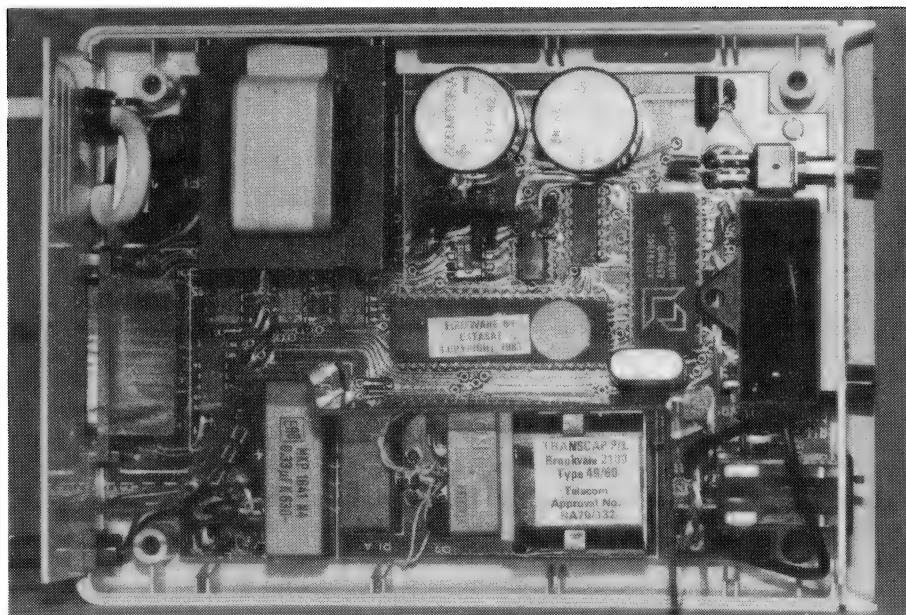
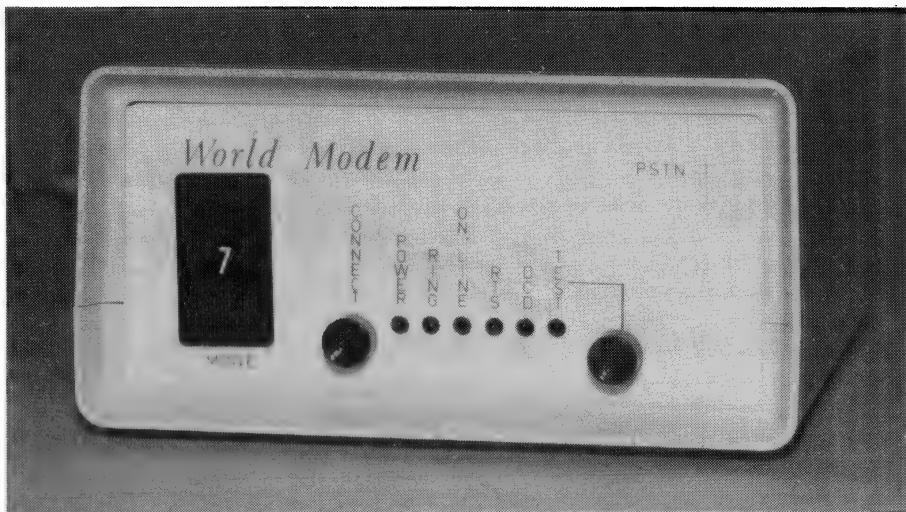
The IC is still relatively expensive but the price is falling as more competitors enter the market. All the previously most difficult parts of the modem design exercise are performed by the IC, with the line interface hybrid and control functions being the only tough parts left for the modem designer.

The Auto Answer Modems

The DataSat World Modem and the Modem Technology UDM-1200 are directly competitive products. They both have largely identical features - CCITT and Bell standards, manual connect or auto answer operation, self-contained, and so on.

The World Modem

The World Modem from DataSat is based on the AMD modem chip. It uses a



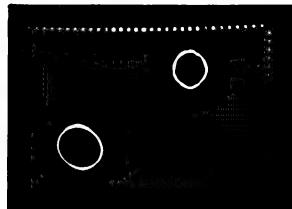
The World Modem - front view, and with the cover off.

single-chip microprocessor to control the AMD modem IC and is surprisingly 'empty' when you open up the box. The microprocessor handles all the external control functions not handled directly by the modem IC. This means that most of the time-related functions and so on are under software (firmware) control and can be easily changed by the manufacturer. This is an elegant solution to the problem.

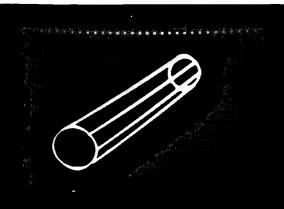
The World Modem supports both CCITT and Bell standards for both 300 bps and 1200 bps FSK modem operation. The selection of mode is controlled by a thumbwheel switch on the front of modem. This switch has several positions marked with a number, each number denoting an operational mode.

After a while I got to know which number indicated which operating mode, but there is no obvious correlation - when I came back to use the World Modem after using some of the others for a while I had to relearn what the numbers meant. DataSat provides a label on the top of the modem which lets you figure out fairly quickly what the numbers mean, but after a while the label becomes tatty and hard to read. The modem box is designed for sitting a standard telephone on top anyway, so the label ends up under the phone!

The modem looks OK, but not great! There is a range of indicator LEDs on the front panel, plus three switches laid out reasonably symmetrically. The white case tends to show dirt rather easily and ►



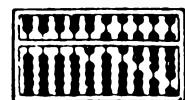
CIRCLE x,y,r,c



DRAW x1,y1,x2,y2,c



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I found myself cleaning it a lot! Fitting under a standard telephone is good feature.

The early test version of the modem was very susceptible to disconnection if there were even very short 'glitches' on the DTR line from the terminal equipment (computer) to the modem. To their credit, DataSat fixed this problem and several others very quickly and they seem quite responsive to customer feedback.

None of the versions I tested could be classed as a plug-in replacement for a Telecom DM-202 in any mode. There were always slight differences in the interface requirements, which prevented direct plug-in replacement. The differences were small and anyone with basic RS-232 interface skills would have overcome them easily. I believe the currently available World Modem model is much closer to meeting the 'plug-in replacement' criterion. The auto answer mode followed the correct Telecom sequence, with STD pauses and echo suppressor tones.

The documentation supplied with the modem is minimal. A short description of the connections and a trouble-shooting guide is provided, along with a flowchart of the internal microprocessor firmware. The documentation is adequate for someone familiar with connecting modems, but totally inadequate for anyone new to communications technology.

The modem is manufactured from good-quality components and materials and should be expected to have a long service life.

The modem was operationally tested on CCITT V.21 300 bps full duplex and CCITT V.23 1200 with 75 bps back channel, and performed well in these CCITT modes. It was also tested on Bell 103, 300 bps full duplex on an ISD line to some US systems and again it worked well. Formal bench test results for CCITT V.21 300 bps operation are in Table 1.

The UDM-1200

The UDM-1200 from Modem Technology is also based on the AMD modem IC and technically performs almost identically to the World Modem. Rather than using a microprocessor to control the modem IC, a number of 'discrete' logic chips are used. Though I consider this solution less elegant, it certainly works well and Modem Technology has been able to respond to problems with hardware solutions as quickly as DataSat did with firmware solutions ... so let's call



The UDM 1200 modem from Modem Technology.

the hardware vs. firmware issue a draw.

The UDM-1200 supports both CCITT and Bell standards as before, but the switching between CCITT and Bell requires opening the case and setting an internal switch. As few Australian users will ever need to use Bell standards, this is not a serious issue.

Mode selection is controlled by several clearly labelled pushbuttons on the front panel and I never had any trouble selecting the correct operating mode for the modem. The UDM-1200 has an additional parallel interface connector which can be used to control some mode-switching functions and can also be used to implement dialling under the control of the external computer.

The case is the same as the Dick Smith Dataphone case. The size of this case is rather annoying as it's just a trifle too small to sit properly under a standard Telecom phone; the feet on the phone fall off the front or the back of the box. The ventilation slots in the box have been laser cut and are very neat. The front panel is well laid out and clearly labelled. The case is grey and didn't seem to pick up dirt easily; I certainly had no trouble keeping it clean.

The UDM-1200 initially suffered from the same problem as the World Modem in respect to DTR glitches dropping it off-line, but this was quickly fixed by

Modem Technology. They also seemed very responsive to customer feedback.

The UDM-1200 I had for test did not meet the test criterion of being a 'plug-in replacement' for a Telecom modem in auto answer mode. It would have worked well as a replacement for most manual connect modes. From what the designer told me recently, I believe the Mark 2 UDM-1200 should be a direct ▶

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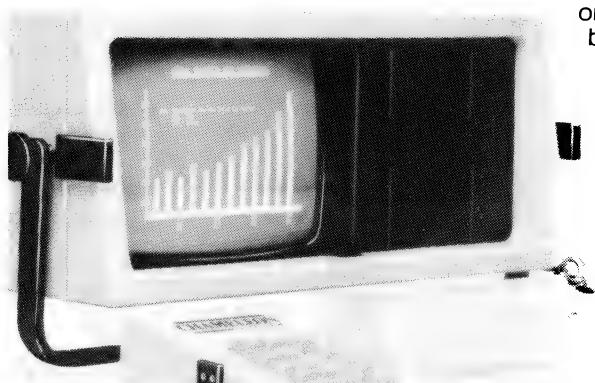
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Table 1. Datasat World Modem.

Test Results: CCITT V.21 300 bps, ANSWER Mode

Pattern	Distortion at Test Modem	
	Early	Late
1:1	04	04
5:1 pseudo random pattern	05	05

Receive bias on 1:1 pattern 3% to 4% towards binary 0

Test Results: CCITT V.21 300 bps, ORIGINATE Mode

Pattern	Distortion at Test Modem	
	Early	Late
1:1	04	04
5:1 pseudo random	05	05

Receive bias on 1:1 pattern 1 to 2% towards binary 1

Carrier detect thresholds:

On to Off: -49 dbm
Off to On: -45 dbm**Table 2. Modem Technology UDM 1200.**

Test Results: CCITT V.21 300 bps, ANSWER Mode

Pattern	Distortion at Test Modem	
	Early	Late
1:1	04	04
5:1 pseudo random	04	04

Receive bias on 1:1 pattern 3% to 4% towards binary 0

Test Results: CCITT V.21 300 bps, ORIGINATE Mode

Pattern	Distortion at Test Modem	
	Early	Late
1:1	04	04
5:1 pseudo random	05	05

Receive bias on 1:1 pattern 1% to 2% towards binary 1

Carrier detect thresholds:

On to Off: -50 dbm
Off to On: -46 dbm

If you can't understand the data presented in these tables, then just ignore them. The performance of all three modems is good!

plug-in replacement for Telecom modems in all modes, but I haven't had a chance to test this model yet. The test model needed software in the external computer to perform auto answer, but the currently available Mark 2 model will optionally perform auto answer like a Telecom modem without external software control. The auto answer sequence is correct.

The documentation supplied with the modem is good. It is designed to guide someone new to data communications through the installation and use of the modem. At the same time it provides sufficient technical information to allow the experienced modem user to get going quickly.

The manual is in a small looseleaf binder which is easy to keep handy to the modem. The documentation I received was version 1.0 and it had a number of technical errors, though a

quick look through the manuals supplied recently showed that most of these errors had been corrected. Unfortunately that recent manual also had several pages printed upside down!

Again, the modem is manufactured from good-quality components and materials and should be expected to have a long service life.

The modem was put through all the same operational tests as the World Modem and worked well. Formal bench test results for CCITT V.21 300 bps operation are in Table 2.

The Cicada

The Cicada modem from Centre Industries is in a different market segment from the previous two modems. It is designed to be directly competitive with the Dick Smith Dataphone modem. It's a manual-connect modem based on a Motorola modem IC. This modem IC isn't as sophisticated as the AMD one and requires a number of additional support ICs to make a working modem, but it is a much cheaper IC to start with. The Cicada only supports CCITT V.21 300 bps standard operation.

The front panel has three switches and four LEDs, all clearly labelled. Interestingly, it is the only modem I have so far tested that has a power switch on the front panel. Originate/Answer mode selection is by another toggle switch on the front panel, as is Phone/Data selection. There are LEDs for Power On, Carrier Detect, Received Data and Transmitted Data.

The case is metal and comes apart in three pieces. It is finished in beige and dark blue and doesn't appear to pick up dirt easily. The case has obviously been made specially for the modem, so it is a great pity that Centre Industries didn't make it a few millimetres deeper, as a standard Telecom phone only just manages to fit, somewhat precariously, on top of the case!

The front panel Phone/Data switch on the Cicada doesn't switch the phone line directly, but is gated through to a relay which controls line switching. When the switch is in the 'Data' position, the relay will only select the modem to line if the DTR line (pin 20) on the RS-232 interface is active. This allows the computer to control connection to line.

For interfaces that don't implement DTR, pin 20 is pulled active internally so that the Phone/Data switch alone controls line switching. This is a nice feature as it allows simple three-wire interfaces to work without problems, but also permits more complex connections to be made to control telephone line connection from software without any modification to the modem. The modem also internally pulls up RTS (pin 4) on the RS-232 interface.

The modem provides a CTS signal (pin 5) to the RS-232 interface but for some reason doesn't provide a DSR signal (pin 6). My software, which is set up to run with a Telecom manual connect modem, wasn't at all happy about the lack of a DSR signal. I was easily able to fix this myself by adding another pull-up



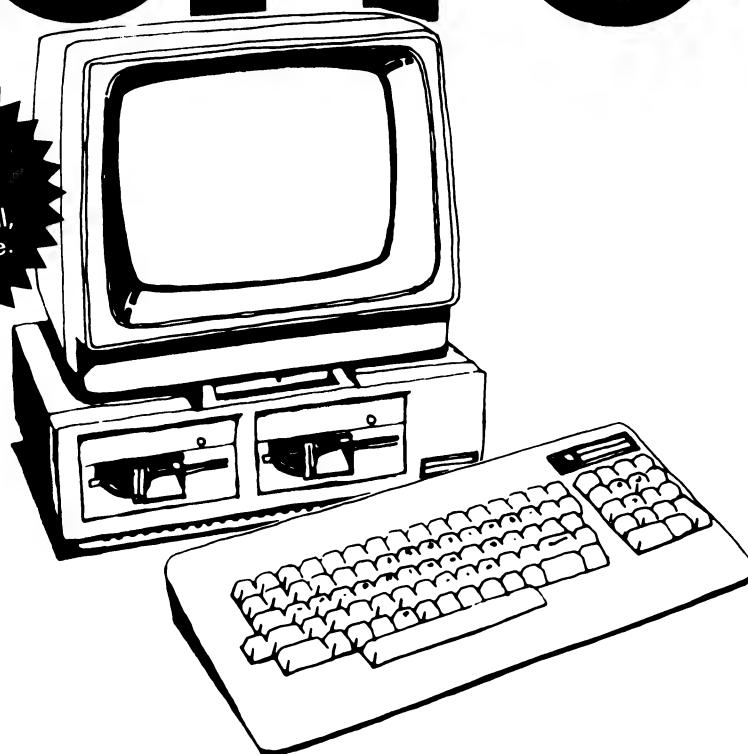
The Cicada modem from Centre Industries — very good value for its price range.

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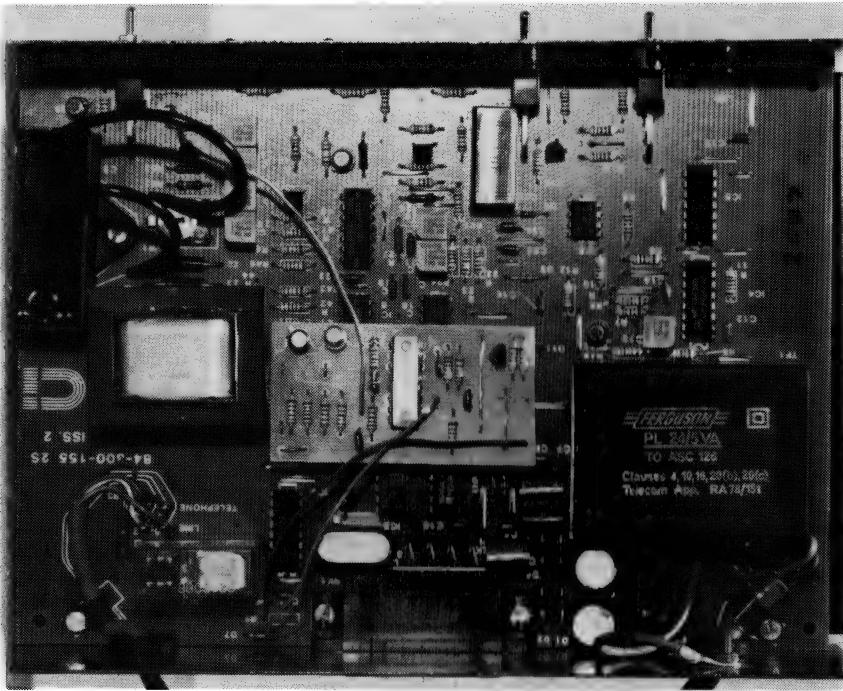
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Inside the Cicada modem.

up resistor inside the modem, but it could present a problem to a non-technical user. This is a minor but annoying problem that Centre Industries could easily fix.

After adding the DSR signal to the RS-232 interface, the Cicada modem was a 'plug-in replacement' for a Telecom manual-connect modem.

Unfortunately I cannot comment on how responsive the Centre Industries people are, as on the few occasions I've tried to contact them, there was no one there. Centre Industries work a nine-day fortnight and I always seemed to catch them on the extra day off when the whole place shuts down; there weren't even any sales staff around! While this presumably suits Centre Industries, it's very frustrating when you want to talk to them about their products.

The documentation supplied with the modem is fairly basic and not really suitable for a newcomer to data communications. An experienced user would have no problem in getting the modem going.

The modem is well made from good-quality components and materials, and should give good service for a long period. I might add that there is only one potentiometer in the whole design, which appears to have nothing to do

with frequency setting, so the modem should be very stable.

The modem was operationally and bench tested for CCITT V.21 300 bps operation. The formal bench test results are in Table 3.

Common To All Modems Tested

All the modems tested require a Telecom 'Type 3' special device connection to access the telephone line, and with this connection will work with standard Telecom phones. They are all Telecom-approved modems with approval numbers clearly shown on the rear of the cases. They are all supplied for 240 V, 50 Hz mains power.

Final Comments

Well, after all that, which one is best?

Now if you're like me, you probably hate those reviews where the reviewer won't declare a definite best buy, but in this case I genuinely don't feel that I can! All the modems tested work well and *Your Computer* is using all three in different roles.

If I had to choose between two auto answer modems, the World Modem and UDM-1200, I guess that on the modems I have in front of me today, I'd pick the UDM-1200 – but the difference is slight. The UDM-1200 has a few more features

Table 3. Centre Industries' Cicada 300.

Test Results: CCITT V.21 300 bps ANSWER Mode		
Pattern	Distortion at Test Modem	
	Early	Late
1:1	10	10
511 pseudo random	11	16
Receive bias on 1:1 pattern	3% to 4% towards binary 0	
Test Results: CCITT V.21 300 bps, ORIGINATE Mode		
Pattern	Distortion at Test Modem	
	Early	Late
1:1	09	09
511 pseudo random	13	11
Receive bias on 1:1 pattern	5% towards binary 0	
Carrier detect thresholds:		
On to Off:	-42 dbm	
Off to On:	-39 dbm	

than the World Modem and is a little less expensive, so it gets the blue ribbon. But the World Modem is a very good modem too!

The Cicada is in a different price/feature class from the auto answer modems and is the best value for money I have seen so far in the modems priced around \$200. I have no hesitation in recommending it to anyone who needs a simple to use, manual-connect 300 bps modem.

More New Modems Coming?

Recently several new direct-connect modems have come onto the Australian market from local manufacturers. These include modems from Woomera Electronics, Electromed/Sendata and Datacraft (same as the Electromed?). So far *Your Computer* hasn't received any of these for review, but if we do, you can expect to see them reviewed here.

The World Modem from Datasat has a recommended retail price of \$678 including tax; you can contact Datasat on (02) 525-6688.

The UDM1200's recommended retail price is \$519 including tax, and is available through Modem Technology on (02) 635-9131.

The Cicada modem from Centre Industries has a recommended retail price of \$229; contact the company on (02) 451-5555.

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Logic for Literati

– Part V

We don't have to tell early TRS-80 owners what debouncing is, but for other seekers after knowledge, Les Bell tackles flip-flops and other circuits as this series on logic continues.

SO FAR, we've looked at combinatorial logic – that is, logic which simply combines a set of inputs to produce a set of outputs. That's fair enough, but it only works for a certain class of problems, and a fairly limited class at that. We'll return to combinatorial logic later as it is very important, but first there are a few other important concepts which I'd like to get across.

How do you think you could build a traffic light controller out of the logic elements we've seen so far? The answer is that yes, of course the logic will reduce to the circuits we have seen, but we really need to have some other, bigger building blocks to tackle the problem.

Traffic lights change their state with time, and so we have to introduce the concept of time into our discussion. We also have to look further at this idea of 'state' and delve into it a bit. It's probably easiest to approach it from a practical viewpoint.

We're going to examine a circuit called a flip-flop; so named because it flips and flops alternately from one state to another. Once set in a particular state it won't change of its own accord, but will hold its state until something happens to make it change.

The circuit of the flip-flop is shown in Figure 1. There are actually several kinds of flip-flop; this is the simplest, called the RS (reset/set) flip-flop. It consists of two gates from a 7400 quad NAND gate, cross coupled to form a circuit which is stable in either of two states.

It will power up in either state randomly, and from then on it will hold whatever state it is currently in, unless one of the inputs is brought low. If S^* is brought low Q will go high, and if R^* is brought low, then Q will go low. Q^* is normally the opposite of Q .

The truth table for this flip-flop is shown in Table 1. As long as both inputs remain high, the outputs will not change, but if either of the inputs goes low, the

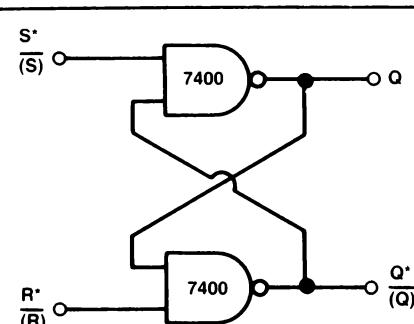


Figure 1(a). RS flip-flop made from two NAND gates.

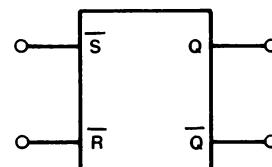


Figure 1(b). RS flip-flop symbol.

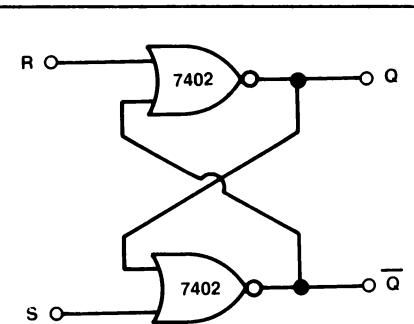


Figure 2(a). RS flip-flop made from two NOR gates.

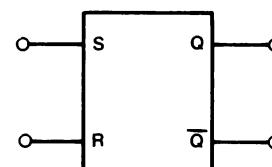


Figure 2(b). RS flip-flop circuit symbol.

outputs will switch to the appropriate state and hold it after the input goes high again. Notice that if both inputs go low together, both outputs will go high, and this condition is usually avoided.

S^*	R^*	Q	Q^*
0	0	1	1
		(Disallowed state)	
0	1	1	0
1	0	0	1
1	1	Unchanged	

Table 1. RS flip-flop truth table (note negative logic).

An RS flip-flop can also be made using half a 7402 quad NOR gate (see Figure 2), but in this case the inputs are normally low and the flip-flop changes state when they go high (Table 2). Notice also that the S and R inputs are reversed.

We can use the RS flip-flop for all kinds of jobs; it is really a single-bit memory. Take, for example, the problem of using a parallel port to interface a keyboard to a microprocessor; the processor is working in a loop, periodically checking whether a data byte has arrived from the keyboard.

S	R	Q	\bar{Q}
0	0	Unchanged	
0	1	0	1
1	0	1	0
1	1	0	0

Table 2.

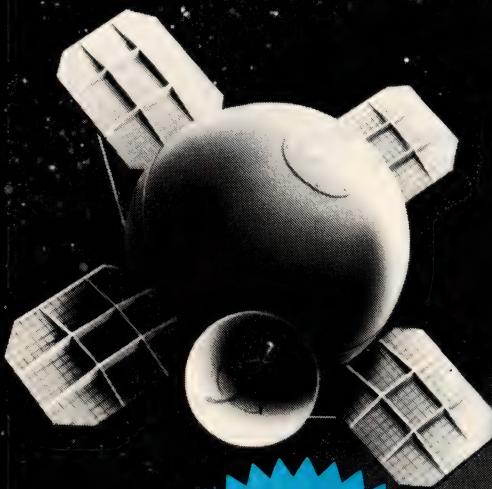
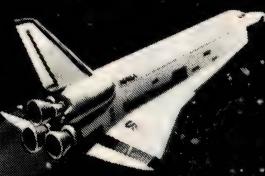
The keyboard generally has seven bits of ASCII data plus a strobe pulse, which goes low for a few milliseconds as a key is pressed. Ignoring for the moment the problems of decoding and presenting the ASCII data to the computer, let's just look at the problems associated with the strobe pulse.

What happens if the strobe pulse goes low and then high again during a period when the processor is too busy to check whether a key has been struck? The processor would miss the keystroke, and in fact this occasionally happens in some systems. However, what happens if the strobe pulse is connected to the S^* input of an RS flip-flop?

This time, when the strobe pulse arrives, it will set the Q output of the flip-flop, and this is what the computer will look at. Even if the strobe pulse finishes and the S^* input goes high again, the Q output will stay in that state.

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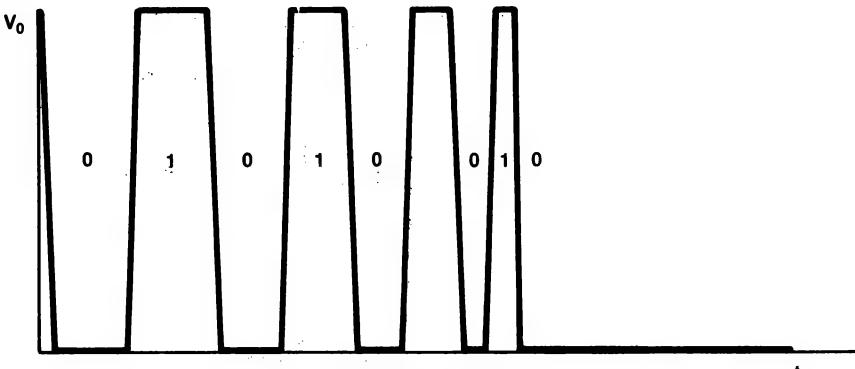


Figure 3. Switch bounce.

After reading the character, or while reading it, the processor will pulse the R* input of the flip-flop, clearing it ready to accept the next character strobe. Voila!

Springy Contacts

Another problem is the way that mechanical switches, being made of metal which is naturally springy, bounce as they make contact, as shown in Figure 3. Logic circuits tend to respond rapidly to input, so the result is a series of pulses which tend to louse up the correct operation of whatever circuit they are involved in.

The RS flip-flop will let us get around that problem by using it as a signal conditioner. We simply use a switch to connect either the S* or R* inputs to ground briefly, as shown in Figure 4, and after the first contact the flip-flop's outputs will hold the appropriate state while the switch finishes bouncing. That's really all that's required.

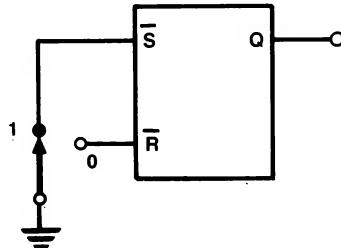


Figure 4. Simple switch debouncing.

However, note that the switch used must be a single-pole double-throw type, and that these are often more expensive than single-throw types. In particular, keyswitches are normally single-pole single-throw types, so this circuit is not really suitable for keyboards. Not only that, to debounce a 73-key keyboard this way would require 37 7400s, and that's a fairly large circuit and a wiring mess!

Other Uses For A Flip-Flop

The flip-flop has other uses too. For

example, a burglar alarm that goes off when a window is opened but then immediately quiets down when the window is closed again would not be very much use. Instead, we can use an RS flip-flop with the S* input driven from the window and the R* input, which will turn the bell off, driven from a keyswitch.

Anywhere we want to remember something, or latch an input, the RS flip-flop is handy.

A related circuit, which solves the problem with the single-pole single-throw switch, is the Schmitt trigger. This circuit uses a pair of cross-coupled inverters and a pair of resistors to 'square up' an analogue signal using positive feedback.

As the input goes positive, nothing much will happen at first until a volt or so, at which point (called the upper trip point) the first inverter output will start to go low. This will make the second inverter output start to go high, driving the input to the first inverter even further positive and so the whole circuit will change state with a snap action. As the input starts to go negative again, it will make no difference until it reaches a point some way below the upper trip point, when the reverse action will occur, and the circuit will suddenly snap back.

The area between the two trip points

is called the dead band, and the whole phenomenon is called hysteresis. The Schmitt trigger has many applications such as squaring up analogue signals for input to counters and timers, but it also makes a good key debouncer, as shown in Figure 5.

This circuit works by discharging the capacitor C1 through the resistor and switch to earth. Although the switch will bounce, the capacitor will discharge quickly and smoothly, and when the switch is released and opened again, it will smoothly charge up through the 1k resistor, but at a slower rate. The Schmitt squares up the output and we have a clean action.

It is often convenient to build a Schmitt trigger out of spare gates in a circuit, but sometimes using non-inverting gates such as the 7408 or 7432 can be more efficient. Best of all are the 7413 and 7414 Schmitt triggers, which require no external resistors and are a generally better component.

Octal Latch Circuits

For latching parallel inputs for microprocessors, such as keyboard inputs or analogue-to-digital converters, octal latch circuits are available, which offer much greater component density. Otherwise, latching a keyboard would require four 7400s, and they would take up a disproportionate amount of printed circuit board real estate.

In general, if you find that performing some function will take four or eight logic elements like flip-flops, and these will occupy a fair area, get out the 7400 Data Book, and start looking through the higher numbers. You will often find the part you want. Whether you can obtain it in small quantities or at a reasonable price is another question.

Next month we'll see how to chain together flip-flops to make counters and dividers. Meanwhile, you might like to try wiring up some of the circuits discussed in this article and checking their truth tables.

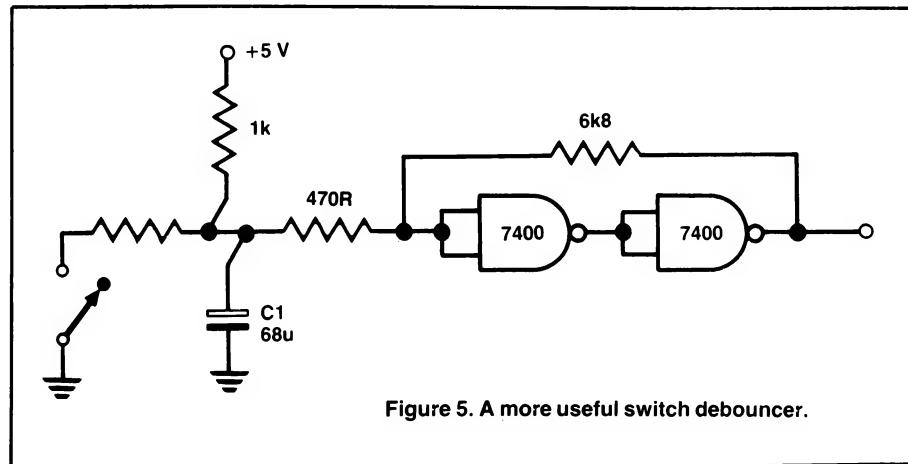
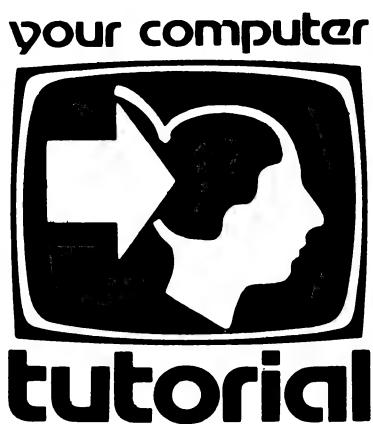


Figure 5. A more useful switch debouncer.



Understanding Assembler

– Part XIV

Continuing last month's exercise of designing a word counting program, Les Bell discusses CP/M file handling, structured design and recursive programming.

LAST MONTH we looked at the conceptual design of a word counting program, and showed a possible design in the C programming language. This month we'll continue with the actual assembly language program.

Having written the program and tested it in C first, the actual writing of the assembler version is not difficult at all. In fact, I did it by copying the C version source file, renaming it to .ASM, and editing it heavily. The knack is to think like a compiler, and don't get tricked into trying to save a few bytes of code by leaving variables in processor registers and pushing and popping them or any other tricky coding practices.

Instead, just set up variables in memory and load and store them directly; that's exactly what most high-level languages do, except those on 16-bit processors which are able to use stack frames – not easy on the 8080 or Z80.

Without further ado, let's examine the program. It starts off in a quite straightforward manner. First we define a few logical and other constants:

```

yes equ 1           ; logical values
no  equ 0
false equ 0'
true equ not false
tab  equ 09h        ; ASCII characters
acr  equ 0dh
alf  equ 0ah
mask equ 7fh        ; to take out high bit of WS does

```

Then we define various CP/M addresses, function numbers and returned values:

```

defdma equ 0080h    ; CP/M default DMA address
fcbl  equ 05ch.     ; CP/M file control block
ex   equ 12          ; extent number
s2   equ 14          ; who knows?
cr   equ 32          ; current record
eof  equ 1ah         ; CP/M end of file marker
bdos  equ 0005h      ; bdos entry point
error equ -1          ; BDOS return error code
warm  equ 0           ; CP/M warm start entry
conout equ 2          ; console output function
openf  equ 15          ; CP/M BDOS open file function
readrec equ 20         ; CP/M BDOS read record function
setdmaf equ 26         ; set DMA address

```

Then comes the start of the program. The first block of code saves the stack pointer value which was set up by the CCP (CP/M's Console Command Processor), since this program will make extensive use of the stack at one point, and we don't want the stack pointer to overrun vital parts of the BDOS.

```

org 0100h
start: lxi h,0          ; set up local stack
       dad sp
       shld oldsp
       lxi sp,stk      ; save old stack

```

The next section takes care of the possible error conditions on the command line. First we check that there is a file name in the command line. Since the CCP will copy the command line tail (everything after the command and the space that follows it) into the first few bytes of the default disk buffer at 0080H, all we have to do is check that the first character (at 0080H) is not a space:

```

wc:   lda defdma      ; examine first character of CP/M
      cpi ' '          ; command tail to check for non-
      jnz wcl          ; existent file name
      call ilprt
      db 'Usage: wc filename',acr,alf,0
      jmp warn

```

Next we try to open the input file by calling a subroutine which will do this for us. The subroutine returns a value in A; if this is 255 (error) then something is wrong – usually the file is not on the specified (or more usually default) disk drive.

```

wcl:  call fopen      ; try to open file
      cpi error
      jnz wc2
      call ilprt
      db 'Cannot open file',acr,alf,0
      jmp warn

```

Now comes the program proper. We start off by setting 'inword' to NO, then get the first character by calling a subroutine. We then strip off the most significant bit, since it should not be set in the ASCII code, but WordStar and other word processors are apt to use it for their own purposes. Then we check that it is not a control-Z, which is the CP/M end of file character. If it is, then we jump to the part of the program which prints the results.

```

wc2:  call inno      ; inword = NO
wc3:  call getc      ; get a character
      ani mask
      cpi eof
      jz wc9          ; is it end of file?
                           ; if so, print results

```

Assuming that we have a valid character in the accumulator, we then proceed to count it, which is simply a matter of loading the current count into HL and performing an increment instruction, then restoring the value.

```

lhld nc
inx h
shld nc      ; nc = nc + 1

```

Next we must check whether the character marks an end of line. If it does, we then increment the number of lines by calling a subroutine, which works in just the same way as the code above. Under CP/M, the convention is that a line feed is the new-line character; however, Tandy and Apple computers don't store line feeds as part of the files, so the program must test for carriage return instead.

```
cpi    alf          ; if (c == '\n')
cz    incnl         ;    ++nl;
```

Next we test for any of the characters which mark the end of a word (space, tab, carriage return, line feed), and if the current character is one of those, we set inword to NO again and jump back to get the next character.

```
cpi    ' '        ;if (c == ' ' || c == '\n' || c == '\t' || c == 0x0d)
cz    inno        ;inword = NO;
jz    wc3
cpi    alf
cz    inno
jz    wc3
cpi    tab
cz    inno
jz    wc3
cpi    acr
cz    inno
jz    wc3
```

By this stage, the character must be a valid part of a word. If inword is currently NO, then this character is the first one of the word, and so we set inword to YES and count another word. That's the main part of the program done, and it turned out not to be too bad.

```
lda    inword      ;else if (inword == NO) {
cpi    no           ;    inword = YES;
jnz    wc3         ;    ++nw;
mvi    a,yes       ;}
sta    inword
lhld   nw
inx    h
shld   nw
jmp    wc3
```

Now comes the final part of the program, the printing of results. The printing of messages is done by an 'in-line print' routine, which will be explained later. For the moment, just believe that the processor does not try to execute the message text when it returns from the 'iprt' routine. Then we load HL with the result to be printed, and call a decimal number output routine. Finally we print a carriage return, line feed at the end of the line:

```
wc9:
call  ilprt        ; printf("number of lines = %u\n",nl);
db    'number of lines = ',0
lhld  nl
call  decout
call  crlf
call  ilprt        ; printf("number of words = %u\n",nw);
db    'number of words = ',0
lhld  nw
call  decout
call  crlf
call  ilprt        ; printf("number of chars = %u\n",nc);
db    'number of chars = ',0
lhld  nc
call  decout
call  crlf
lhld  oldsp        ; restore stack
sphl
ret
```

Well, that wasn't so bad, was it? The only problem is, we now have some subroutines to write to perform lower-level tasks for the main program, and structured design techniques don't help quite so much at this level. However, they are generally quite short.

We'll start with the file open subroutine, which simply clears a couple of bytes in the file control block, sets DE to point to the fcb, and then calls the BDOS to perform the appropriate

function. The FCB has been initialised by the CCP, so it already contains the file name.

```
;      /* subroutines */
;
fopen:
    xra    a
    sta    fcbl + ex      ; opens a file named in fcbl
    sta    fcbl + s2      ; zero extent, s2, current record
    sta    fcbl + cr
    lxi    d,fcbl
    mvi    c,openf
    call   bdos
    ret
```

Next comes the trickiest part of the program: the 'get character' function. The trouble is that CP/M wants to read the disk 128 bytes at a time, whereas we only want one. So what we do is make a subroutine that uses a pointer to read successive characters from a 128-byte buffer, and refills that buffer whenever necessary.

Since the default buffer is 128 bytes from 0080H to 00FFH, we can tell the pointer has over-run the buffer end if the least significant byte becomes zero. If we were writing a fully functional 'getc' routine to operate with a buffer anywhere in memory, a slightly more sophisticated technique would be required.

If the pointer has reached the end of the buffer, then we call a routine which fills the buffer. Notice that we have to preset the pointer to force getc to fill the buffer the first time it is called.

```
getc:
    push   h          ; gets a character from buffer,
    lhld   lastc      ; refills buffer if necessary
    inx    h          ; get pointer into buffer
    shld   lastc      ; increment it
    mov    a,l          ; and save it again
    cpi    0h          ; have we reached the end of the buffer?
    cp    fillbuff    ; if so, then refill it
    mov    a,m          ; get the character
    pop    h
    ret
```

lastc dw defdma + 7fh

The fill buffer routine sets DE to point to the FCB, then resets the character pointer.

```
fillbuff:
    lxi    d,fcbl      ; point to fcb
    mvi    c,readrec   ; and get record
    call   bdos
    lxi    h,defdma
    shld   lastc      ; reset character pointer to beginning
    ret
```

The next routine sets inword to NO:

```
inno:
    push   psw         ; set inword = no
    mvi    a,no
    sta    inword
    pop    psw
    ret
```

Then comes the routine to increment the number of lines:

```
incnl:
    push   h          ; nl = nl + 1
    lhld   nl
    inx    h
    shld   nl
    pop    h
    ret
```

The inline print routine is a very handy routine which uses a nice feature of the 8080 family of processors. When the routine is called, the CALL instruction places the return address (the next byte after the CALL) on the stack. This routine swaps the top of the stack with HL and uses it as the address of the string to be printed. When it detects the null (0) byte at the end of the string, it swaps the top of stack with HL again, and returns – only by now HL has been incremented past the string, so the return is to the correct place. It's one of those nice, satisfying, elegant things you can occasionally do in assembler.

```

ilprt:    xthl          ; in-line print routine
          ; get ptr and save hl
ilplp:    mov  a,m          ; get char
          ora  a          ; reached end
          jz   ilplx        ; yes, exit
          call cout         ; print char
          inx  h          ; point to next
          jmp  ilplp        ; and go round
ilplx:    inx  h          ; pt to byte after ending 0
          xthl           ; restore hl and return
          ret

```

Outputting decimal numbers is a tricky task, since it involves division by 10. Fortunately, we are only dealing with positive numbers, which makes life a bit easier.

This routine saves the processor registers, then performs repeated subtractions of 10 until it sees a negative result, when it adds 10 back in again. The number of times it was able to subtract is the quotient. It then tests for zero remainder, and if the remainder is not zero, calls itself again to output remaining digits of the result, which is why the routine saves the processor registers.

Note also that the routine outputs the digits after returning from itself, which is how it calculates the digits to be output from least significant to the most, but outputs them in reverse order.

```

decout:   push b          ; decimal output routine
          push d
          push h
          lxi b,-10        ; radix for conversion
          lxi d,-1          ; this becomes no divided by radix
decl:    dad b          ; subtract 10
          inx d
          jc  decl
          lxi b,10        ; add radix back in once
          dad b
          xchg :
          mov a,h
          ora l          ; test for zero
          cnz decout      ; recursive call
          mov a,e
          adi '0'          ; convert from binary to ASCII
          mov e,a
          mvi c,conout     ; to e for output
          call bdos
          pop h
          pop d
          pop b
          ret

```

Finally, there are a couple of routines to output a CRLF and do console output, followed by the variables. Notice that the initial stack pointer is declared at the end of the stack space, not the start, as the stack grows downwards; this caused me hours of fun once!

```

crlf:    mvi a,acr        ; print CRLF
          call cout
          mvi a,alif       ; no call, no ret required
cout:    push psw
          push b
          push d
          push h
          mov e,a
          mvi c,conout
          call bdos
          pop h
          pop d
          pop b
          pop psw
          ret
inword ds 1          ; inword flag
nl  dw 0          ; number of lines
nw  dw 0          ; number of words
nc  dw 0          ; number of characters
oldsp ds 256        ; old stack pointer
                   ; stack space
stk equ $          ; stack space
end

```

That's it. It's not terribly complex, but it does illustrate a few points about structured design.

If it wasn't for the fact that I had set tab equal to 8, not 9, when I first typed the program in, it would have worked first time, which is unusual for assembler programs. Of course, modules like the 'getc' function were written long ago and had been tested out in other programs, but generally, each of them only had one error to fix at the first testing stage.

The design for getc, by the way, came from the book Software Tools, by Kernighan and Plauger, where it appears in the first chapter, written in FORTRAN. I can't remember where I first saw the decout routine, but I've been using it for years. □

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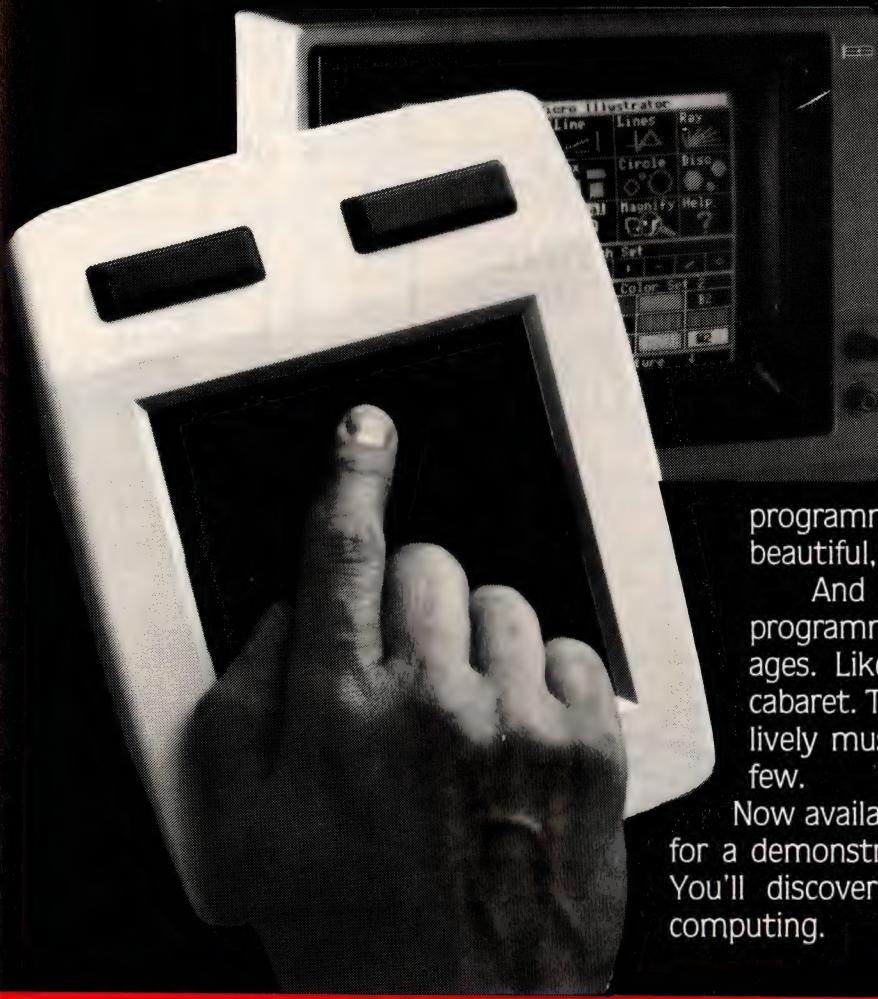
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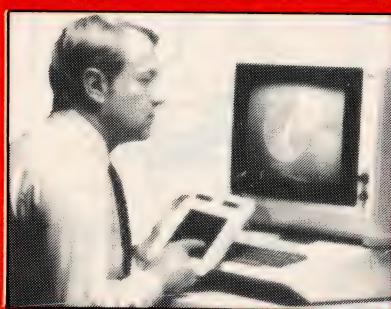
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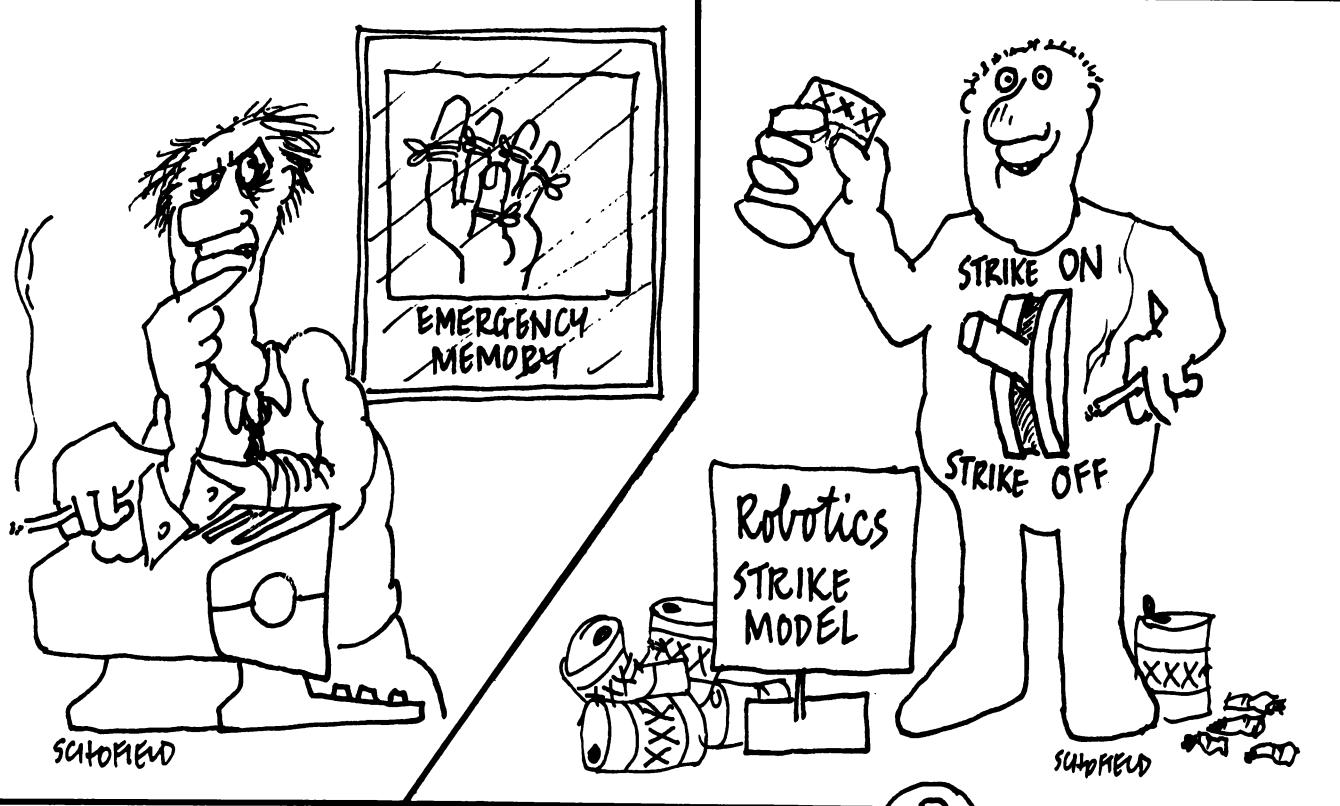
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Microbee Graphics

Part 1

Most reviews of the Microbee comment at some stage on the limitations of its high-resolution graphics. However, many other computers do not even have such high-resolution, and the Microbee provides an alternative low-resolution as standard. The aim of this article, by Mike Oborn, is therefore to correct false impressions of the Microbee's graphics and to provide an insight into the graphics commands of Microworld BASIC.

IN LOW-RES mode the VDU is divided into 48 rows of 128 dots, which increases to a resolution of 256 rows of 512 dots in high-res mode. Figure 1 depicts these layouts.

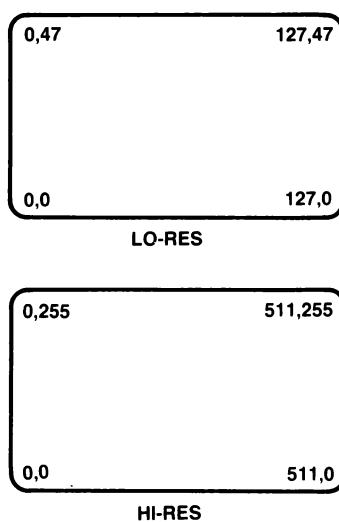


Figure 1

Unlike some other computers, the Microbee has the origin of its screen display in the bottom left-hand corner.

In both high-res and low-res modes, groups of dots can be addressed in the form of character spaces. Figure 2 depicts these character spaces in both high-res and low-res modes, where it can be seen that low-res characters are far more chunky.

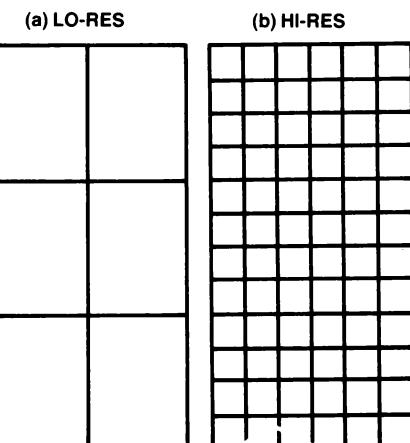


Figure 2

A quick calculation (on your Microbee?) will reveal that in either format there are 16 rows of 64 character spaces on the VDU, a total of 1024 addresses in screen memory. This layout is depicted in Figure 3, where the screen origin is now depicted in the top left-hand corner.

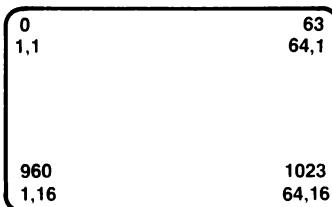


Figure 3

A character space can be addressed in either of two ways – by reference to its x and y co-ordinates, or by reference to its character position, which starts at 0 in the top left-hand corner and increases to 1023 in the bottom right-hand corner. This leads us to study the range of commands provided in Microworld BASIC for graphics displays.

Graphics Commands

There are two ways of placing graphics on the VDU. The first is by turning on (or off) individual dots to form the desired shape; the commands for this are SET, RESET, INVERT, PLOT

and POINT. Each of these commands is expressed in terms of the x and y co-ordinates, as depicted in Figure 1, for example SET x,y, or PLOT x1, y1 TO x2, y2. These commands can be used in either high-res or low-res mode provided the values of x and y fall within the respective parameters of that mode.

For compatibility with programs written for computers with their screen origins in the top left-hand corner, the letter 'H' can be appended to these command words to invert the y-axis: RESETH x, y. For this reason a space must follow the command word if a suffix is not added. There are other suffixes which can be added to the PLOT command: 'I' inverts the state of the dots being addressed, and 'R' resets the dots.

The following short program will demonstrate the use of some of these commands:

```
100 CLS: LORES
110 FOR X = 20 TO 100 STEP 4: SET X,10: SET X,40: NEXT X
120 FOR X = 10 TO 40 STEP 4: SET 20,X: SET 100,X: NEXT X
130 FOR J = 1 TO 1000: NEXT J
140 PLOTI 20,10 TO 20,40 TO 100,40
TO 100,10 TO 20,10
150 NORMAL : END
```

This program SETs dots in the form of a rectangle in the middle of the screen; only each fourth dot is SET. The PLOTI command then follows the sides of the rectangle, inverting the state of each dot and so giving a rectangle with three out of each four dots SET. The command CLS clears the VDU screen. If hi-res mode is used it is not necessary to clear the screen as this command does it automatically.

Line 130 is only a timing loop to clearly separate the two phases of the screen display. (NB: A graphics mode (like 'LORES') must be specified before any of the graphics commands covered here are used.)

The NORMAL command returns the PRINT output to normal format, which is not strictly necessary except after INVERSE, UNDERLINE and PCG.

While it may be desirable at times to program a display by addressing individual dots, it is also possible to address groups of dots in the form of the character spaces depicted in Figure 2. The ▶

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second method of placing graphics on the VDU is by addressing these character spaces with the following commands: POKE, PEEK, CURSOR and PRINT.

First the CURSOR command. This takes two forms - CURS x or CURS x,y. The first form of this command is similar to the PRINT AT command used in some other dialects of BASIC. The value of x is that for the position starting at 0 in the top left-hand corner of Figure 3. Alternatively the CURSOR can be positioned by referring to its x and y coordinates. Once the cursor is positioned we can PRINT the required graphics detail to the VDU. Both the following lines will print the same graphics character (the letter A) in the same place:

120 CURS 960: PRINT CHR\$(65)

or

120 CURS 1,16: PRINT CHR\$(65)

By the use of the POKE command we can place data into the RAM area of the Microbee which holds its screen memory; this starts at address 61440. Position 0 on Figure 3 is this screen memory address; position 1 is 61441 and so on to position 1023, which is memory address 62463. Thus the following line will also print the same graphics character in the same place as either of the two lines above:

120 POKE 62400,65

Now we know how to display our chosen graphics shapes we had better consider the range of shapes available.

Graphics Characters

In Figure 2 we saw that the character spaces in both low-res and high-res modes comprise a series of dots, each one individually addressable. High-res graphics use the Microbee's programmable character generator (PCG), a detailed study of which will be left until the second part of this article. However, normal ASCII-coded characters are also formed within the same 8 by 16 character space of figure 2(b), but the top four rows are left blank and the bottom three rows are only used for descenders on characters such as p and q and the underline in UNDERLINE mode.

This means that most ASCII characters are formed within rows 12 down to 4 - the first column (actually bit 07) is also left blank to provide a space between each character on a line. Using this portion of each character space ensures adequate spacing between lines of text, but makes it difficult to build a picture using the character set provided. A complete listing of the graphics symbols using the POKE command in high-

Table 1.

CODE	SYM-BOL																
0	□	32	!	64	€	96	'	128	■	160	■	192	■	224	■	224	
1	Γ	33	:	65	A	97	a	129	■	161	■	193	■	225	■	225	
2	↓	34	"	66	B	98	b	130	■	162	■	194	■	226	■	226	
3	└	35	#	67	C	99	c	131	■	163	■	195	■	227	■	227	
4	↖	36	\$	68	D	100	d	132	■	164	■	196	■	228	■	228	
5	▣	37	%	69	E	101	e	133	■	165	■	197	■	229	■	229	
6	✓	38	&	70	F	102	f	134	■	166	■	198	■	230	■	230	
7	Ω	39	,	71	G	103	g	135	■	167	■	199	■	231	■	231	
8	↑	40	(	72	H	104	h	136	■	168	■	200	■	232	■	232
9	→	41	)	73	I	105	i	137	■	169	■	201	■	233	■	233
10	≡	42	*	74	J	106	j	138	■	170	■	202	■	234	■	234	
11	↓	43	+	75	K	107	k	139	■	171	■	203	■	235	■	235	
12	↓	44	,	76	L	108	l	140	■	172	■	204	■	236	■	236	
13	←	45	-	77	M	109	m	141	■	173	■	205	■	237	■	237	
14	Θ	46	.	78	N	110	n	142	■	174	■	206	■	238	■	238	
15	Ø	47	/	79	O	111	o	143	■	175	■	207	■	239	■	239	
16	▣	48	Ø	80	P	112	p	144	■	176	■	208	■	240	■	240	
17	⌚	49	1	81	Q	113	q	145	■	177	■	209	■	241	■	241	
18	⌚	50	2	82	R	114	r	146	■	178	■	210	■	242	■	242	
19	⌚	51	3	83	S	115	s	147	■	179	■	211	■	243	■	243	
20	⌚	52	4	84	T	116	t	148	■	180	■	212	■	244	■	244	
21	⌚	53	5	85	U	117	u	149	■	181	■	213	■	245	■	245	
22	⌚	54	6	86	V	118	v	150	■	182	■	214	■	246	■	246	
23	⌚	55	7	87	W	119	w	151	■	183	■	215	■	247	■	247	
24	⌚	56	8	88	X	120	x	152	■	184	■	216	■	248	■	248	
25	⌚	57	9	89	Y	121	y	153	■	185	■	217	■	249	■	249	
26	⌚	58	:	90	Z	122	z	154	■	186	■	218	■	250	■	250	
27	⌚	59	;	91	[	123	{	155	■	187	■	219	■	251	■	251
28	⌚	60	<	92	\	124	:	156	■	188	■	220	■	252	■	252	
29	⌚	61	=	93	]	125	}	157	■	189	■	221	■	253	■	253
30	⌚	62	>	94	^	126	~	158	■	190	■	222	■	254	■	254	
31	⌚	63	?	95	-	127	⌘	159	■	191	■	223	■	255	■	255	

CODE	SYM-BOL																
0	□	32	!	64	€	96	'	128	■	160	■	192	■	224	■	224	
1	Γ	33	:	65	A	97	a	129	■	161	■	193	■	225	■	225	
2	↓	34	"	66	B	98	b	130	■	162	■	194	■	226	■	226	
3	└	35	#	67	C	99	c	131	■	163	■	195	■	227	■	227	
4	↖	36	\$	68	D	100	d	132	■	164	■	196	■	228	■	228	
5	▣	37	%	69	E	101	ē	133	■	165	■	197	■	229	■	229	
6	✓	38	&	70	F	102	f	134	■	166	■	198	■	230	■	230	
7	Ω	39	,	71	G	103	g	135	■	167	■	199	■	231	■	231	
8	↑	40	(	72	H	104	h	136	■	168	■	200	■	232	■	232
9	→	41	)	73	I	105	i	137	■	169	■	201	■	233	■	233
10	≡	42	*	74	J	106	j	138	■	170	■	202	■	234	■	234	
11	↓	43	+	75	K	107	k	139	■	171	■	203	■	235	■	235	
12	↓	44	,	76	L	108	l	140	■	172	■	204	■	236	■	236	
13	←	45	-	77	M	109	m	141	■	173	■	205	■	237	■	237	
14	Θ	46	.	78	N	110	n	142	■	174	■	206	■	238	■	238	
15	Ø	47	/	79	O	111	o	143	■	175	■	207	■	239	■	239	
16	▣	48	Ø	80	P	112	p	144	■	176	■	208	■	240	■	240	
17	⌚	49	1	81	Q	113	q	145	■	177	■	209	■	241	■	241	
18	⌚	50	2	82	R	114	r	146	■	178	■	210	■	242	■	242	
19	⌚	51	3	83	S	115	s	147	■	179	■	211	■	243	■	243	
20	⌚	52	4	84	T	116	t	148	■	180	■	212	■	244	■	244	
21	⌚	53	5	85	U	117	u	149	■	181	■	213	■	245	■	245	
22	⌚	54	6	86	V	118	v	150	■	182	■	214	■	246	■	246	
23	⌚	55	7	87	W	119	w	151	■	183	■	215	■	247	■	247	
24	⌚	56	8	88	X	120	x	152	■	184	■	216	■	248	■	248	
25	⌚	57	9	89	Y	121	y	153	■	185	■	217	■	249	■	249	
26	⌚	58	:	90	Z	122	z	154	■	186	■	218	■	250	■	250	
27	⌚	59	;	91	[	123	{	155	■	187	■	219	■	251	■	251
28	⌚	60	<	92	\	124	:	156	■	188	■	220	■	252	■	252	
29	⌚	61	=	93	]	125	}	157	■	189	■	221	■	253	■	253
30	⌚	62	>	94	^	126	~	158	■	190	■	222	■	254	■	254	
31	⌚	63	?	95	-	127	⌘	159	■	191	■	223	■	255	■	255	

Table 2.

we standardise the options

C. Itoh's new CI-300 Dot Matrix Line Printer includes a variety of performance extras that many impact devices offer only as options . . . all for a very low cost of ownership.

Ideally suited for a wide range of business and scientific graphics the CI-300 offers variable print speeds of up to 300 L.P.M. and a wide range of character sizes and qualities.

Other standard features include:

- Full graphics capability (dot addressable—PLOT mode).
- Complete font flexibility allows characters to be 1, 2, 4 or 8 times normal width and height (4 and 8 times are option).
- 30 IPS paper feed speed meets demand for high speed transmission.
- More than 100 kinds of printer parameters including character spacing, line spacing, DAVFU, etc., are selectable through both operation panels and commands from host computer.



- Standard horizontal resolutions of 60 to 400 dots per inch and 144 dots per inch vertical resolution ensure print qualities previously unavailable in a high speed line printer.
- Full test features with two digit display for simplified fault identification reduce service calls.
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c.itoh

So for the printer which comes with practically everything as standard, contact your local Warburton Franki office.

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res mode is provided in Table 1, where it can be seen that 32 special graphics symbols (codes 0 to 31) are provided.

Using the PRINT CHR\$(x) command (where x is the ASCII code between 0 and 225) will produce a slightly reduced listing. Codes 0 to 31 are not printable; they are control characters — for example CHR(7) is BELL — Control G; Code 127 is delete. By the way, ASCII code 95 is not included on the Microbee's keyboard, but can be generated by pressing the shift and delete keys simultaneously.

From Table 1 it can be seen that in high-res mode, codes 128 to 255 print inverse characters of codes 0 to 127.

Table 2 provides another listing of graphics characters, this time in low-res using the POKE command. Where codes 129 to 255 were inverse characters in high-res mode, these have now become chunky graphics. However, note that codes 192 to 255 are merely repeats of codes 128 to 191, created by numbering each of the six dots that comprised the low-res character spaces of Figure 2(a). This has been reproduced in Figure 4.

1	2
4	8
16	32

Figure 4

If we want to turn on the dots numbered 1, 2, 4, 16 and 32, for example, we total the value of the relevant dots, add them to 128 and we have the code for that shape specified in Table 2. Unlike high-res and other ASCII characters, low-res characters fill the full character space and can be joined to build solid pictures. Note that the high-res characters of codes 0 to 31 are also available in low-res mode. Using the PRINT CHR(x) command produces the same reduced character range as we saw above with high-res.

This completes the first part of this article. In the second part we will look into the restrictions caused in the high-res mode by the programmable character generator (PCG); the creation of graphics characters using the PCG; and the other two graphics modes — UNDERLINE and INVERSE. □

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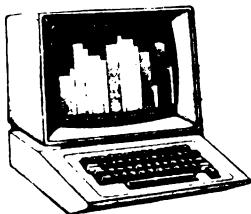
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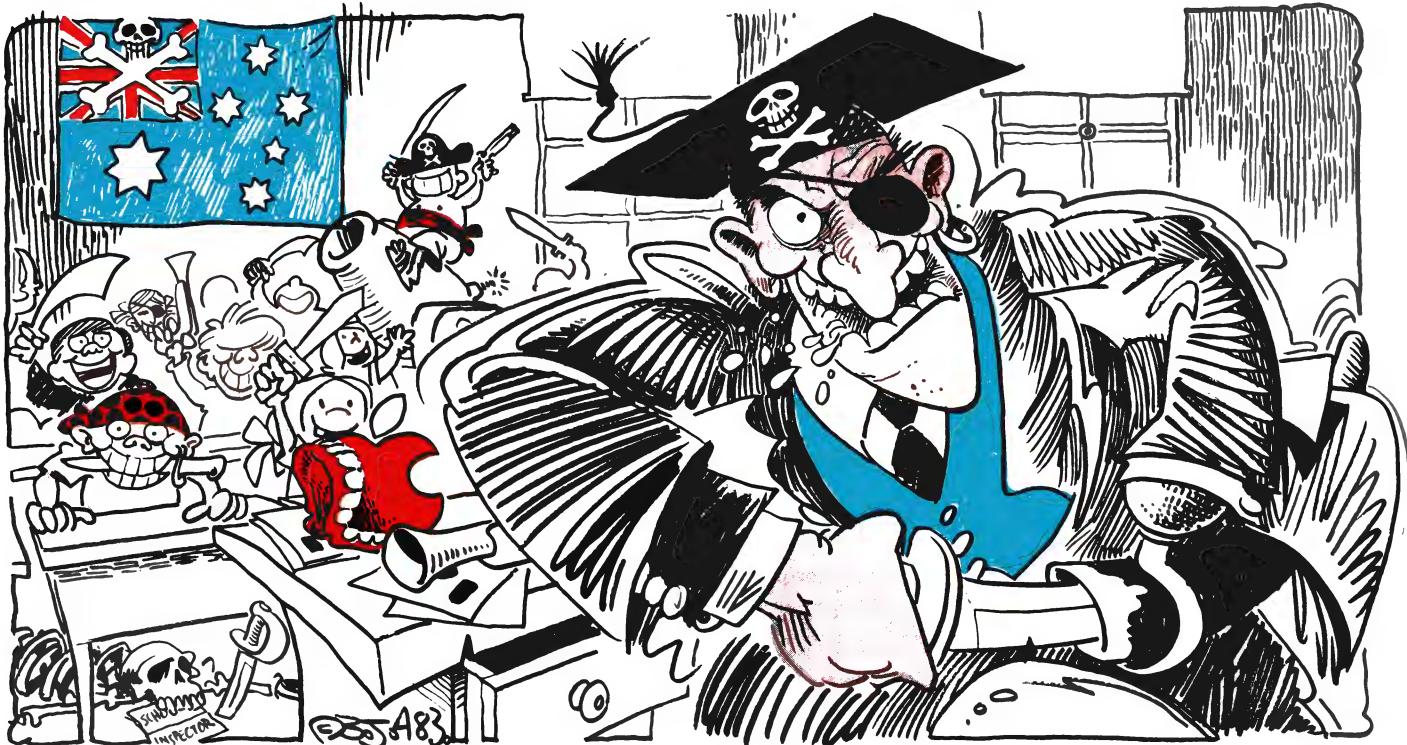
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your computer text file



Software Pirates

AFTER READING the March edition of *Your Computer*, I am compelled to respond to the contents of Colin Legg's letter regarding software piracy.

Although no one would deny the existence of the software 'bootleg' industry and of its thriving existence in schools, one may question the extent of teacher involvement, as depicted by Mr Legg. I wish to clarify the situation as far as it concerns the Education Department of South Australia.

The Education Department of South Australia has, through its focus for schools' computing, long recognised the value of high-quality educational software and the need to protect the rights of authors and distributors.

To this end, the Angle Park Computing Centre has, as a matter of priority, maintained a policy of protecting all software bought or reviewed by the centre from copying.

Although such a policy and example set by the Education Department does not entirely eliminate the piracy of software in the South Australian schools, it does constantly place before teachers in South Australia the importance of maintaining software propriety.

I trust that this statement of the situation in South Australia will clarify for your readers the policy regarding piracy of software in this state and the fallacy, in this state at least, of in-service conferences acting as 'bootleg' software distribution centres.

DAVID SHIRES
Acting Head of Centre
Angle Park Computing Centre
Angle Park, SA

Using the TEC F10-40 With Wordstar

RECENTLY I purchased an F10-40 daisywheel from Dick Smith, wired up a cable to connect it to the (parallel) port on my S100 system, INSTALLED it in Wordstar as a C.Itoh StarWriter and stood back, confidently expecting pages of beautifully printed, micro-space-justified text to pour out.

The result: garbage!

As the trouble could have been in either the hardware (the cable interconnections or the printer) or the software (Wordstar or the CP/M system), I began an investigation which showed that the printer would 'TYPE' files correctly from CP/M and would operate as a 'Teletype-like' printer from Wordstar, but not as a daisywheel. It also responded to its special daisywheel orders when driven from a test program assembled into machine language.

A program sending directly to the output port was then entered into Wordstar and all the features of the daisywheel suddenly began operating correctly. The problem was caused by a software trap for the escape code embedded in my CP/M system.

While it is not likely that other readers will have similar trouble, I did find it difficult to obtain accurate information on the installation of these printers in Wordstar, and time was lost testing suggestions which proved to be wrong. Other readers therefore may be interested in the following advice just received from MicroPro International:

"The C.Itoh (TEC) F10-40 printer functions correctly with Wordstar by installing using the C.Itoh StarWriter menu selection and con-

figuring the printer's switch banks as follows:

Left bank – switches 1, 4, 6, 7 and 8 closed (towards the rear), remainder open.

Right bank – switches 3, 4, 5 and 8 closed, remainder open."

D L HOLLOWAY
Gordon, NSW

An article in this issue of *Your Computer* discusses the same TEC F-10 printer used with an Osborne 1.

Just The Magazine

WHAT SEEMS a long time ago, *Your Computer* magazine was just what I was looking for. Then, to keep commercial I suppose, TRS80/System 80 information was cut down in the magazine to make way for other computers.

At that time I dropped the magazine from my regular reading list in favour of others still catering for my needs. Recently, I purchased a copy again to see 'What was what', and what do I find, basically one page. Admittedly a very informative page (I just picked up bulletin 41 from 'Uncle Dick'), so I figure I recouped my loss on that alone – thank you.

MR R VERGOS
Chadstone, Vic.

We've had quite a few similar reactions from TRS80/System 80 users since our regular column started getting shorter – so starting in the October issue the TRS80 column was back to its usual longer format. ▶

Computer Hams

EVER SINCE the discovery, almost 100 years ago, of the physical phenomena on which radio communication is based, its development has owed much to the enthusiasm of the amateur radio operators.

These hams, as they are known, have contributed greatly to technical advances over most of that period, at least partly because their hobby provided the communications medium for discussing innovative ideas over long distances with others having similar interests.

It is already clear that similar technical advances in the allied subject of computing are being contributed by computer hobbyists, who must depend on the personal computing magazines to provide the communications link for their exchange of ideas and mutual education.

Please allow me to place on record my thanks to the editors, contributors and letter writers for the encouragement and inspiration provided by the little gems of knowledge that can be found by diligent search in every issue of *Your Computer* and other similar magazines.

GRAHAM MCINTOSH
Vaucluse, NSW

Help Wanted

WE NEED SOME help. Our Apple has a CED Super COM II parallel/serial card. However, the school does not appear to have a manual for this and we need to adjust the baud rate via the DIP switches for our serial.

Could you or your readers locate any information on this board for us, please?

JOHN PEACHEY,
Edenope High School,
P.O. Box 117,
Edenope, 3318

MicroBee Searchers

WE HAVE a MicroBee and are interested to see if there is a users' group yet. As several letters have been published in *Your Computer* from MicroBee users who would, perhaps, like to start a club, we would be interested in linking up with them to form such a users' group.

Our MicroBee has an editor/assembler, 32 kilobytes of RAM and is hooked to a Dick Smith GP-80 printer. We have found it to compare well with other makes, except for a lack of software.

We can be contacted at 12 Highcliffe Close, Tullamarine, 3043. Our after-hours phone number is (03) 338-7363 Melbourne.

BILL AND MARK BELTON
Tullamarine, Vic

Heartache Territory

IT HAS BEEN said in many magazines that the Commodore VIC-20 is the world's best home computer. After buying one, I now know that this is not true.

The VIC-20 may be good for people who

know a great deal about microcomputers, but for beginners such as myself it's just one heartache after another.

The user's manual which came with the computer isn't very helpful at all. The book is very confusing and far too complex. The three programs that are on the back few pages are very confusing and, for a beginner, they're too long and difficult.

Can anyone help me with some short and easy programs for my VIC-20? I can be contacted at 8 Ahern Street, Ayr, 4807.

JOHN JONES
Ayr, Qld

Sharp User Group

THE SHARP Computer Users' Association meets at Burwood Heights High School, Mahoney's Road, East Burwood (Victoria), on the second Friday of each month of the school year.

The association is a non-profit organisation. Our main interest at the moment is the PC1500/Tandy PC2, but the owner of any Sharp computer is welcome to attend meetings.

A I HARRIS
Syndal, Vic

Latrobe Valley Club

THE LATROBE Valley TRS80 Colour Computer User Group was formed at Morwell (Victoria) late last year, and began holding monthly meetings in January.

Anyone interested in the group can contact me at 31 Donald Street, Morwell, 3840.

GEORGE FRANCIS
Morwell, Vic

Peach Problems

WHEN YOU get your Hitachi Peach computer in this neck of the woods and discover the complete documentation (Peach's advertising) that you receive is a disk manual for L3 BASIC and you operate a cassette, and it keeps referring to a L3 BASIC manual, you really are up against it.

It's baffling that manufacturers spend thousands of dollars in magazine advertising, glossy brochures and so on and then fall down in explaining to the user - who is, after all, essential in the scheme of things - the elementary instructions and functions of the machine and what it is capable of.

N A WATTS
Busselton, WA

Aviation Programs

WITH REFERENCE to the January/February issue of *Your Computer*, a correspondent on page 80 sought information regarding aviation programs.

I have a fairly lengthy listing of a flight planning program, which I use on my Video Genie/System 80 and which can be contained within 16 kilobytes of Level 2 BASIC. I have merged a professional colleague's Great Circle navigation program into a pro-

gram allowing a choice of three different aircraft types (more could be added at will), and the final printout lists departure and destination, minimum fuel required, point of no return and critical point. The program does need some tidying-up, which I am working on, but is fairly presentable.

If your correspondent (R. Webster, of Tuggerawong) would care to get in touch, I'll discuss the matter further with him.

I. G. McDONELL
P.O. BOX 272
Gisborne, Vic 3437

Integer On An Apple

THIS IS A reply to a letter by D R Moore of Warrane, Tasmania, in the clinic column of *Your Computer*, April 1983.

To run an Integer program on any 48K Apple, whether it has Integer BASIC or not, can be accomplished by first running a program called INT48K. This program will install an Integer BASIC interpreter into the Apple's RAM and then the required Integer program can be run just like an Applesoft one.

Most Apple users would have this program, so ask at a local users' group. If they don't have a copy, send a dollar and a disk to:

Apple Users' Group (Sydney)
P.O. Box 505
Bankstown 2200.
If you include a letter explaining what you need it will surely be supplied for you.

B J THURKETTLE
St Ives, NSW

SBASIC Books

COULD YOU PLEASE recommend any books on SBASIC? I have checked around various bookshops but have been unable to come across any on this language. Would it be at all possible for you to compile and publish a comprehensive directory of books on computer topics, currently available in Australia, complete with distributor, publisher and so on? Such a guide would be invaluable to people, particularly those out of town like myself, looking for books on particular topics.

I am using a MicroBee disk system; please keep up the good work in supporting this great little Australian computer.

I would like to also let you know that we in the Blue Mountains are forming a separate (from the Blue Mountains C.C.) 'MicroBee Computer Club'. This is only in the formation stage at the present, but anyone in the area who is interested in participating can contact Roger Cooper on (047) 58 7238 at any time.

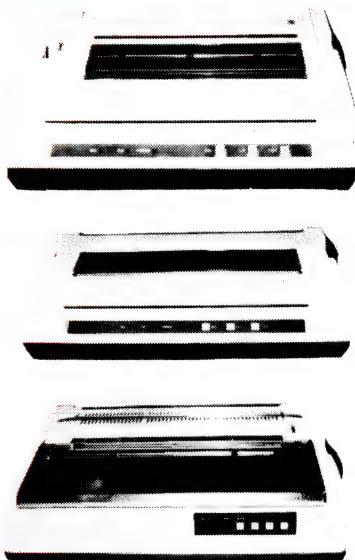
MR R COOPER
Woodford, NSW

In the October issue we published a catalogue of *Your Computer* books now available from us by mail order. This contains books about all aspects of computing, and will be published at regular intervals.



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Error Detection: (1) Parity (VRC)—Odd, Even, No-parity. Switch selectable. (2) Framing Error—Start character error. (3) Error—Error is detected when data are received before the previous data have been processed.

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Print speed is 120 characters/second. Up to 136 characters can be printed per line at 10 CPI.

Its main features are: • Compact desk-top dot matrix printer • 136-column print • Lightweight • Low power-consumption • High-quality print • Bit image graphics • Graphic Symbols • Prints in six different languages • High reliability • Low cost.

F-10 Printmaster Daisy Wheel Printer

Print Speed: 40 CPS. **Print Method:** Static Print Impact. **Number of Printable Columns:** 136, 163, Variable. **Character Spacing:** 1/120 Inch (minimum). **Line Spacing:** 1/48

Print Time: 900 msec. **Line Feed Time:** 40 msec. **Paper Width:** 406 mm (maximum).

Print Characters: 96. **Printwheel:** Industry Standard 96 Character Wheel Interface: Industry Standard 8-bit Parallel, RS232-C Compatible, 96 Character Wheel and Diablo Compatible. **Dimensions:** 574 mm W x 405 mm D x 153.5 mm H (22.5" W x 15.9" D x 6" H). **Weight:** 14 kg (30.8 lbs.) with cover and power supply. **Noise:** Less than 65 Db (IM from Platen, A Scale).

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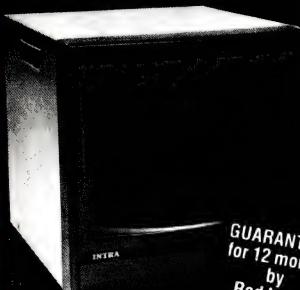
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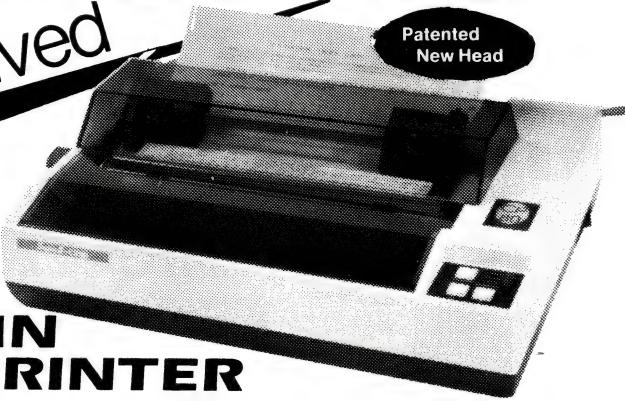
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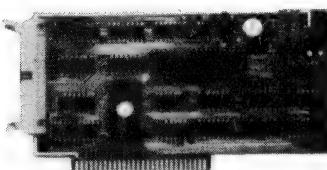
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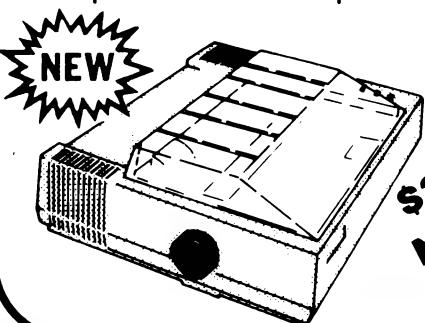


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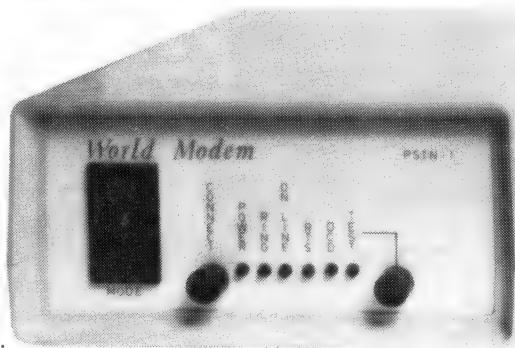
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Getting dBest From dBase

— Part IV

This month, sorting and indexing files – the essential concept of the dBase system. Les Bell continues his series on dBase.

THE WHOLE POINT of putting information into a computer is to get it into some semblance of order. Generally we mean alphabetic or numeric order. This provides us with the ability to produce reports such as stock sheets in alphabetic order or stock number order, as well as providing faster location of any item within a database file.

dBase provides two commands which can be used to organise databases to provide orderly reporting and quick enquiries. Firstly, it can sort a file into order, based on a key field, and secondly, it can construct an index which allows it to access any record very quickly.

The SORT command takes the form:
SORT ON <keyfield> TO <filename>
ASCENDING (or DESCENDING)

SORTing actually moves records around in the file to place them in the correct order. This has a number of consequences.

For a start, it is very slow, as the entire file will have to be rearranged. Secondly, if any records are appended at this stage, they will be out of sequence. While a file is being reorganised in this manner, it is very vulnerable to system failures; if the system went down in the middle of a sort, it could leave the file in a completely irretrievable state. For this reason, we copy the database to another file while sorting, so that the original file is still available as a back-up.

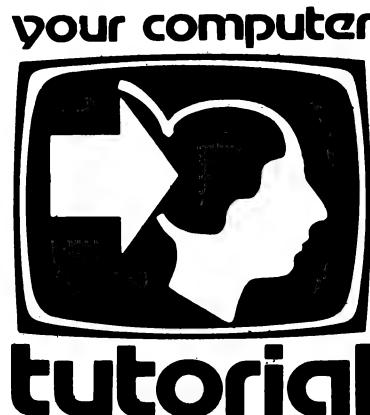
Before sorting a file, we must decide on which field we wish the program to organise the file. Should it be surname or postcode, part number or description? The item of information on which we want the sort based is known as the key. Some systems allow a key to be constructed from multiple fields or parts of fields.

dBase will only sort on one key field, which is a particular nuisance when a file contains names, and one wants to have both surnames and first names used in the sort, so that Smith, A. appears before Smith, B. There are ways around this, as we shall see.

A sorted file is generally much better from the point of view of performance, however. This is because if it is not sorted, the disk drive read/write head has to move around to find the appropriate record while performing reads. If the file is sorted, it only has to read sequentially in most cases.

An alternative method of organisation is indexing. Here, dBase constructs special files containing the keys to the main database, which can be left unsorted. The index file is organised as a B-tree, which means that a particular key can be located very quickly, and stored with the key is the record number of the corresponding record in the database, which can then be instantly retrieved.

Most importantly, dBase can create an index file based on the concatenation of multiple fields or substrings of fields. This will allow us to order files on first name within surname.



The INDEX command takes the form:
INDEX ON <expression> TO
<filename>

The expression above can be any string expression, with the exception of the TRIM function, which will give unpredictable results. To take the example of our bookshop inventory in Part III:

INDEX ON author TO author
will produce a file called AUTHOR.NDX which contains the index information. Now LISTing the file will show it in author order, except that we've got both first names and surnames in the author field, so it's not really terribly useful.

Once an index file has been created for a database, it can be used with it at any time in the future by extending the USE command:

USE <datafile> INDEX <indexfile>,<indexfile> ... ,<indexfile>

Alternatively, once a file is in use, one can use the command:

SET INDEX TO <indexfile>,<indexfile> ... ,<indexfile>

Notice also that up to seven index files can be in use with any one database at one time.

Once an index file is in use, subsequent APPEND, EDIT, REPLACE, READ or BROWSE commands will automatically update the index. Beware, however, as multiple indexes can slow the system down terribly, particularly when performing the REPLACE command.

Once an index file is in use, if the index is not up to date, it can be brought up to date with the REINDEX command in dBase version 2.4. Version 2.3 or prior owners will have to use the full INDEX ON command to rebuild the indexes.

Moving Within Databases

Moving within databases is achieved by several different commands. Most important of these is the FIND command. This takes the form:

FIND string

or

FIND 'string'

FIND operates on files that have been indexed, and simply finds the first key that matches the characters in the FIND subject. Because it operates through the index file, FIND is very fast. In fact, the FIND command is the main mechanism through which one is able to set up true relational databases using dBase (always accepting the two-file limitation).

In general, using a 20 cm floppy disk system, FIND should be able to locate a record within a second and a half at the outside.

For example, once our books inventory database is indexed on author, we can immediately find the first book written by David Cortesi by simply typing 'FIND David'. Notice the FIND command simply positions the database pointer, but does not display the record, so we must use a separate DISPLAY command to see the record.

The nearest equivalent to FIND for non-indexed databases is LOCATE, which actually performs a character-by-character search through the database file. As a result it is much slower, and should be avoided wherever possible. Its format is:

LOCATE [<scope>] FOR <expression>

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The expression can involve any field in the database, not necessarily an index key. The scope allows us to restrict the effect of the LOCATE.

For example, we could examine books priced at under \$20 with the command LOCATE FOR SELL:PRICE < 20.

LOCATE will set the record pointer to the first record which satisfies the expression. To go on to the next record, use the CONTINUE command. This will move on to the next record which satisfies the expression.

Notice that although LOCATE accepts a scope, if you use a FOR clause, then the scope will default to ALL, so it will move to the beginning of the database before performing the search. To search forward from your current location, use LOCATE NEXT 65535 FOR <exp>.

Less useful, in general, is the GOTO command. This takes several forms:

GO TOP
GO BOTTOM
GOTO RECORD <n>
GO <n>

This command can be used to rewind the database, or to position anywhere within it. The final positioning command is SKIP, which simply moves the record pointer to the next record. SKIP can be used with a value, so that SKIP 4 will move forward four records, while SKIP

-1 will move back one. Beware, however, as on most versions of dBase negative SKIPS will not work on indexed databases.

Updating Databases

Apart from the EDIT command discussed above, there are several commands which allow us to update the database. For example, suppose we wanted to raise our book prices by a flat 10 per cent across the board.

This can be achieved with the REPLACE command. The syntax of the command is this:

REPLACE [<scope>] <field> WITH <exp> [,<field> WITH <exp>] [FOR <exp>] [NOUPDATE] [WHILE <exp>]

Sounds complex, but it's not. In our case, we type:

REPLACE ALL sell:price WITH sell:price * 1.1

This will go through the database file performing the specified calculation. In the case of an indexed file, it will also check that the key has not been changed, and if it has, it will update the index files. This feature can be disabled using the NOUPDATE option when you know the index will not be affected.

The default scope of the REPLACE command is the current record, so that the ALL scope is required to operate on

the whole database. This is because the REPLACE command is particularly useful in programming, as we shall see.

The CHANGE command invokes the line editor function in dBase, to operate on named fields. You may have noticed that if you type in a command line which dBase cannot make sense of, it will offer you the chance to retry the line with some editing.

CHANGE does the same thing. The format:

CHANGE [<scope>] FIELD <list> [FOR <exp>]

The system will now display the record number of each record which meets the FOR expression, then the current value of each field in the FIELD list, and offer the user the chance to change it.

Memory Variables

As well as the fields within a database, dBase is able to use up to 64 variables in memory. Memory variables can be of the same types as fields, and dBase works out the type of a variable from the context of its first assignment. Unlike conventional languages which use the '=' sign for assignment, dBase uses special keywords.

The most general way of assigning a value to a memory variable is:

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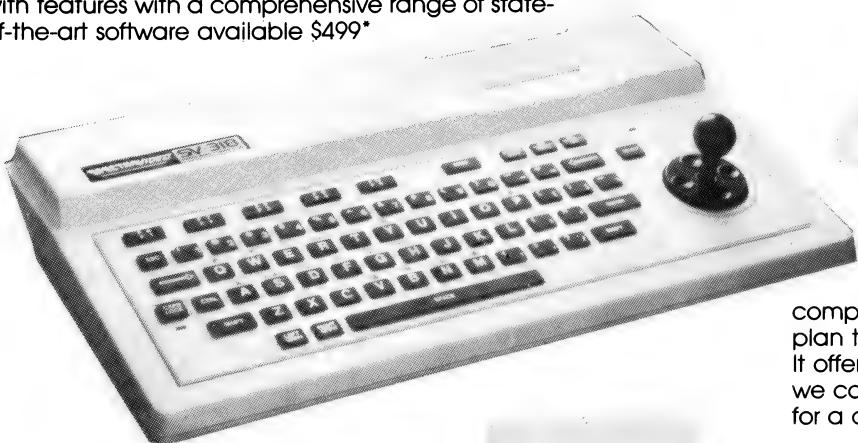
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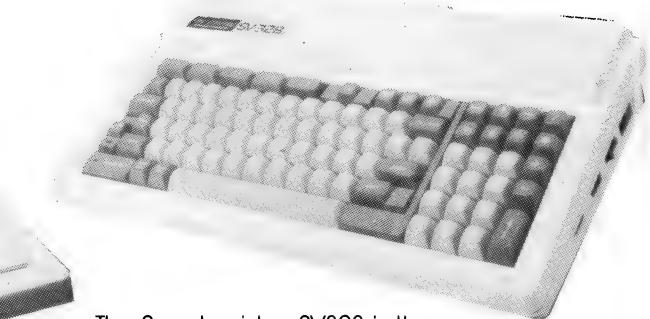
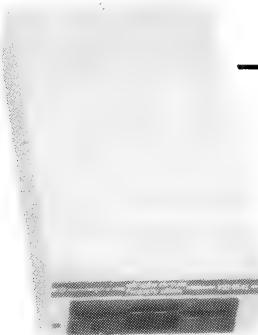
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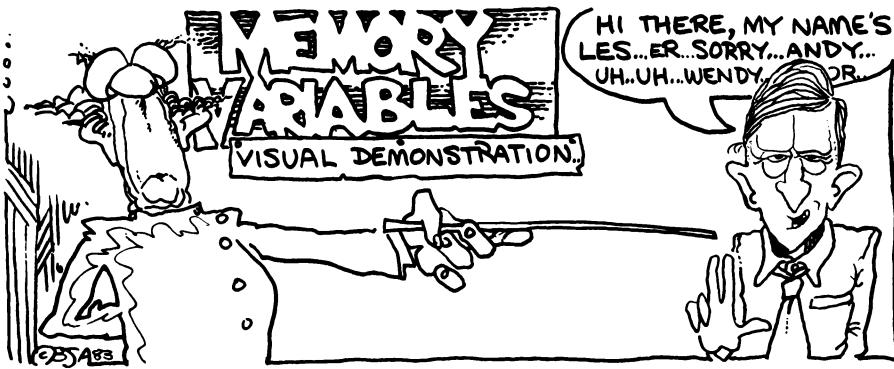
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STORE <exp> TO <memvar>

If done from the keyboard, with TALK SET ON, dBase will respond with the value assigned to the variable. To print its value, just type ? <memvar>.

The most common use of memory variables is in getting input from the keyboard. Here there are several commands. The most generally useful is the ACCEPT statement, which is rather like INPUT in BASIC. For example:

ACCEPT 'What is your name' TO name

What is your name:Les

? name

Les

Note that ACCEPT always places the input into a string variable. INPUT, on the other hand, works out the type of the input data; but then strings must be input with quote marks around them.

WAIT will halt execution and wait for a single character to be input, as in the example above.

The contents of memory can be displayed for debugging purposes by the command DISPLAY MEMORY. This will show each variable name, its type and current value. It will also show how many variables exist, and how many bytes of memory have been used.

Memory variables can also be saved in a disk file. The command:

SAVE TO <file> [ALL LIKE <skeleton>] can save either all memory variables or those which match the skeleton, where the skeleton is constructed in exactly the same way as CP/M wildcard filenames.

The variables are read back by the RESTORE statement:

RESTORE FROM <file> [ADDITIVE]

If the ADDITIVE phrase is included, the memory variables are added to those already in memory, while if it is omitted, all existing variables are overwritten.

Since only 64 memory variables can exist at a time, it is important to be able to reclaim them when they are no longer needed. This is done with the RELEASE statement:

RELEASE <varlist>

RELEASE ALL

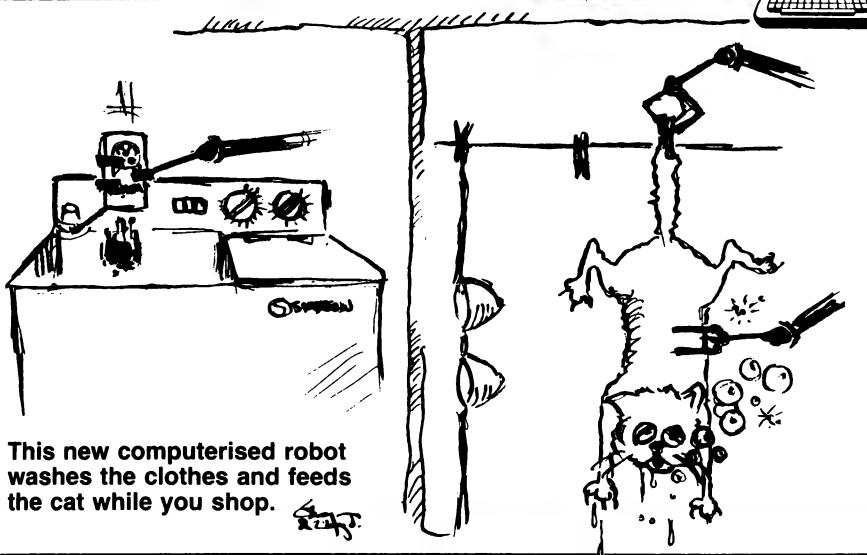
RELEASE ALL LIKE <skeleton>

RELEASE ALL EXCEPT <skeleton>

The ability to use skeletons only applies to version 2.4 on, and of course is not much use unless one is logical about naming variables.

Next month we'll look at screen handling, parameters, and the necessary background for dBase programming. □

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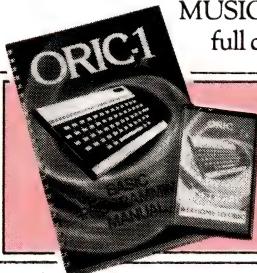
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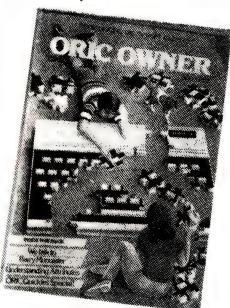


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your TRS80 computer

By Rod Stevenson

Model 100, Model 4

As I write this in August (magazines don't happen overnight!), I've just seen the new Tandy Models 100 (the portable) and 4 (the replacement for the Model 3).

Although I'd never have dreamed anyone would, I recently became aware of one of our users' group members who was selling his Model 3 and replacing it with a Model 100. I felt great despair at hearing this and immediately set about attempting (with success, thankfully) to dissuade him from rushing in.

As I keep suggesting to would-be newcomers to our hobby: consider the reality of what you want to do with the computer and what you expect from it before you decide which particular unit to buy. Even Tandy doesn't (at least I've gathered so much from their advertising and from speaking to their staff) expect the Model 100 to be a hobbyist's main computer.

The Osborne is an entirely different concept in portability (and I understand Tandy will be releasing a similar kind of thing in Australia soon). It is apparently used by a majority of owners as their only computer, and for this it is quite suitable – with a larger screen. But the Model 100 is not intended as a replacement; rather I see it as an additional 'transport' facility.

All this is merely to tell you to think before you buy!

I was impressed that the Model 4 is being sold for the same price (\$3300) for which the Model 3 was sold prior to the discounting of final stocks. Admittedly the CP/M will cost more, as does the extra 64K memory to enable use of the 'virtual disk', and the RS232; but at least it's new technology, not just a few changes to a Model 1 in a new case.

Storage Media

Regular readers will know my preference (some have called it obsessive paranoia) for TDK-D tapes as being of the particular bias rating to suit our recorders and the signal generated by our particular cassette interface, which is far more critical than the Kansas City standard.

I've not done such exhaustive tests on diskettes, but I've never had a failure from Verbatim Datalife, whereas I know quite a few people who've had failures from other equally reputable brands. I know most diskette makers guarantee their products, and indeed do replace defectives, but I prefer to use something

which doesn't have the reputation of occasionally failing.

I think the reason for the performance record of TDK and Verbatim is their quality control standards. I don't really believe the actual 'base' product is superior, just that the inferior ones are detected before they get to the marketplace. And since they cost no more, why not use them?

Of course, being of a mechanical nature, both diskettes and cassette tapes do wear out in time with use. So don't expect a tape to last forever – with TDK, though, I've found my old ones don't suddenly lose all their recording as do some (expensive) supposedly specialist data tapes I've had for an equal time; they just require a second attempt to record on them. It's then time to replace the tape.

The above assumes cleanliness in the recorder – a speck of dust will prevent a recording on the piece of tape it covers, and if you consider we're trying to record 500 bits of information on every 1-7/8 inches of tape it's obvious dust is not welcome!

Fixed RAM

There are a number of addresses used by BASIC programs to make use of the operating system. These are contained in the various ROM reference manuals available from a variety of sources (I recommend the one from Micro 80 in Adelaide). But it seems all the manuals do assume (not always justifiably) that if you want to use such a technique in your BASIC programs you will need only the barest explanation of the information contained at the relevant addresses, and that you will need absolutely no explanation of what to do with it after you've got it.

I can understand that way of thinking, but I don't agree that it's valid. The way around it, I suggest, is very much by trial and error: get the information and see how (and if) you can use it, rather than look for a really detailed step-by-step instruction guide as to how to use it.

That's really the way to learn anyway – do it for yourself.

An example will illustrate: 16546-7 contains the current line number being interpreted; 16602-3 contains the last DATA line read. So if you want to print out the line number of the DATA together with the actual data you'd use PRINT PEEK(16602) + PEEK(16603)*256. This can be particularly useful in circumstances where you're going to

want to change the data regularly – such as racing form for example. But if you PEEK 16546-7 all you'll get is the READ statement line.

Screen Shimmer

It seems a number of us just accept that screen shimmer is unavoidable if there is a power supply close enough to the screen to deflect the electron beam as the transformer produces its constantly changing electric field. Not necessarily so! As well as the obvious remedy of moving the power supply further away (which is not always possible because of physical limitations), one can try moving it around the monitor to see if there's a changing effect depending on where it is in reference to the monitor's own power supply.

Having a Model 1, I've found the fields from the power supplies for my keyboard and interface can be effectively cancelled out by putting one upside-down on top of the other; the closeness to the monitor then doesn't seem to matter.

Graphics Blocks

I suppose we've all seen the various charts that are published as a reference to produce the various graphics characters in the Models 1 and 3 and System 80. What is not so often published is the way these shapes are built up.

By reference to Diagram 1 I hope it will become clear. The graphics blank space is ASCII character 128, which is the starting point for this diagram. If you PRINT CHR\$(128) you'll get a blank space.

If you PRINT CHR\$(129) you'll get the top left pixel (smallest graphics block); if you PRINT CHR\$(131) you'll get the top two graphics blocks, because what you've effectively done is to print the 128 for the blank space +1 +2 = 131

128+	1	2
	4	8
	16	32

– and so on until PRINT CHR\$(191), which is the full white graphics block, being the blank 128 +1 +2 +4 +8 +16 +32 = 191. It's another case

where experimentation will reveal all!

Using Memory

There seems to be some lack of understanding about the memory map provided in the various manuals and handbooks. It's really just a question of inter-

pretation: it is all there if you're prepared to spend enough time with it!

BASIC will always load into the bottom (low numbers) of memory, and proceed to use however much it needs until it is all loaded; it won't take any more until it's RUN.

On RUN, the operating system will use space for its own working. By looking at the map you'll see that immediately above the program there is space for a number of variable types (simple, string, array and so on). There's not much you can do about this without quite sophisticated programming techniques, so don't worry much about the space taken up.

The space taken from the top (high numbers) of memory is where the user does have easy control. Right at the top is where the facility of protecting memory (by answering the Mem Size question on power-up) is provided. This is intended to allow a machine-code routine to reside out of the way of the BASIC program, and to be protected from it.

If you didn't answer the Mem Size question BASIC will assume there's nothing up there, and therefore take it for its own purposes. The first (from the

top down) 50 bytes will be used as string space unless you've altered this default value of 50 by a CLEAR statement in the BASIC program.

The string space is just what you might expect from the name: a space for BASIC to work on the strings within the program — which means actually working on them when any string functions are used. If there is A\$ = "FROG" as a program line then it should be understandable that this does not require any actual working on the string value. But if there is a statement in the program B\$ = A\$ + "S AND DOGS" there will be a need for a space for BASIC to get the current value of A\$, put it somewhere so that it can add to it, then get the characters to be added and assign the completed (and lengthened) string "FROGS AND DOGS" to the string variable name B\$.

So far OK? Because our version of Microsoft BASIC allows such powerful manipulations of variable length strings there is a need for string space to be always available, and for the same reason the string space is continually getting clogged up and being cleared up by the BASIC operating system. This

takes time, which is why there is sometimes a delay in a program (such as a mailing list) which uses a lot of string manipulations.

Not a comprehensive explanation of the string area required by BASIC, but hopefully helpful.

Immediately below the afore-mentioned string space is an area used by BASIC for its stack. This is not a topic one need worry about: it is necessary for the operation of the BASIC interpreter to do its thing, and we can't do anything about it anyway!

However, it is evident that if too much string space is used there will be none left above a large BASIC program for the stack to work in, which means that BASIC will not be able to work at all. So although the CLEAR statement is contained in the BASIC code, it actually takes string space from outside the program; this is where the confusion seems to lie. The available free memory is therefore not reduced because the program has grown, but because some of what was initially free memory has been reserved for use by the program.

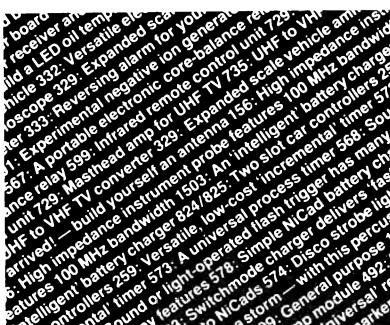
Admittedly a circuitous concept, but really quite logical! □



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your CP/M computer

By Bill Bolton

Book Review

Osborne/McGraw-Hill, 'Z80 Assembly Language Subroutines', by Lance Leventhal and Winthrop Saville (ISBN 0-931988-91-8). This book is a good source and reference for the Z80 assembly language programmer. It provides a ready source of routines for some common and/or complex tasks in assembler level programming and generally aims to eliminate the 'reinventing the wheel' syndrome.

The book is divided into two sections. The first is an overview of Z80 assembly language programming, including an excellent section on common programming errors which should be mandatory reading for anyone programming at this level for both 8080 and Z80. The second, larger section of the book is the actual subroutines.

For each subroutine, the authors have standardised the format of presentation and parameter passing, so there are few surprises as you move through the book to new subroutines. A good description of the intended function of each subroutine is given. Entry and exit conditions are detailed, and examples of typical input and output shown. The strong style and documentation of the routines is in itself a good example.

The subroutines described cover a wide range of applications. At this point I had the idea that I should list just a few to show what they typically cover, but on flipping through the book I found that I'd really have to list the lot, as the range of material covered is so wide. Several quite complex topics are well presented, and no one could accuse this book of avoiding 'difficult' areas.

No assumptions are made about the target hardware or operating environment other than its containing a Z80, so the routines should be applicable to many systems, CP/M based and otherwise. The subroutines also cover some of the common Zilog Z80 support chips such as the SIO, PIO and CTC.

This book is an excellent companion to Leventhal's 'Z80 Assembly Language Programming' (also published by Osborne/McGraw-Hill) and is in much the same readable style. The glossary at the back is useful, while the index is comprehensive and easy to use. Unfortunately, McGraw-Hill forgot to tell me what the local recommended retail price was, so I can't tell you what sort of value for money it is, but it certainly ranks as a 'must have' book for me.



ONE UNENDING source of confusion for CBASIC users is DRI 'quaint' naming conventions for its CBASIC products. DRI has two CBASIC products. The first is what they call 'CBASIC Language', which is the intermediate code compiler version of CBASIC that produces INT files that are executed with CRUN. The second version is what DRI calls 'CBASIC Compiler', which is the native code compiler version that eventually produces COM or CMD files for direct execution without the need for a runtime loader.

The 'CBASIC Compiler' is also often called CB80 (for CP/M-80) or CB86 (for CP/M-86) even by DRI themselves! The 'CBASIC Compiler' is upwardly compatible from the 'CBASIC Language', which means that programs written for the 'CBASIC Language' will compile with little or no change under the 'CBASIC Compiler'. The 'CBASIC Compiler' has many extra features and instructions which the 'CBASIC Language' doesn't support and executes much, much faster.

Well then, why are there two versions of CBASIC at all? The 'CBASIC Language', being an intermediate code compiler, is much easier to port to a new machine environment than a native code compiler. You can therefore generally expect that the 'CBASIC Language' product for a new CP/M processor implementation will appear a long time before the 'CBASIC Compiler' version. This was certainly the case with CP/M-86.

Also, the intermediate code produced by any implementation of the 'CBASIC Language' compiler will execute with the CRUN (run-time) loader for any other

implementation. I have a number of commercial INT code programs produced with 'CBASIC Language' for CP/M-80 which execute exactly the same on CP/M-86 with CRUN86.

The main reasons for having a native code version at all are speed of execution and the convenience of not requiring a separate run-time loader, though the extra language features of the 'CBASIC Compiler' are also important in their own right.

If you think all those references to 'CBASIC Language' and 'CBASIC Compiler' are confusing, just imagine how boring it gets when you have to explain it to customers several times a day!

CBASIC Compiler Version 2

That last section was really just a preface to this section – DRI has released a new version of 'CBASIC Compiler' for both CP/M-80 and CP/M-86. As well as correcting a number of bugs in both implementations, the new versions have the GSX graphics interface commands in them. The graphics commands are described in a new section of the manual and there is a program, supplied in source code form, which demonstrates each of the commands. The graphics commands are quite different from the type Microsoft provides in the various versions of GWBASIC and to me they seem better thought out for serious graphics work.

The aspect ratio of the display device can be read back from the GSX and inserted into program variables, so a program can scale its output to keep the same appearance on output devices of widely different aspect ratio. Any of the GSX-supported output devices can be accessed, and portability appears to be excellent. A graphics test program which I wrote and have run on several different brands of CP/M-86 computers with GSXs has executed as expected on all of them, even though the graphics display device characteristics and resolution were quite different.

As well as the general demo program, example code for drawing circles is included with the 'CBASIC Compiler' package. There are some CBASIC source files which must be included in any CBASIC source program that wants to use the graphics commands. This is very simple to do and is clearly explained in the documentation.

Along with the graphics extensions, for operating systems that support date

and time functions (such as MP/M and Concurrent CP/M-86) two new intrinsic commands return date and time information to CBASIC programs. A detailed list of fixed bugs from the previous version is also provided.

I have heard a few people say the DR-KERNEL is embedded in 'CBASIC Compiler' to give the graphics interface. This is wrong. The stand-alone DRI graphics products for CP/M-86 all use the large-memory model and require a separate command loader to control memory loading prior to execution. The code produced by the 'CBASIC Compiler' version 2 uses the small-memory model and executes without the need for a command loader, so it cannot be using the DR-KERNEL.

Already one commercial program written using the 'CBASIC Compiler' graphics commands has appeared. Chang Labs has added graphics output capabilities to its 'Microplan' financial planning package and called the new product 'Graphplan'. Graphplan allows display or plotting of graphs from the spreadsheet portion of the package and is totally integrated. Any changes to the spreadsheet data are reflected directly in the graph next time it is displayed. Some of you will have seen this package in action at 10ACC.

The graphics extensions to 'CBASIC Compiler' have given me a further taste of what 'device independent' graphics through GSX means ... more, more ... give me more!

Personal BASIC

I've now had a chance to take a brief look at the Personal BASIC documentation from DRI. It looks OK at first pass. There is a good tutorial on using the language as well as a language reference manual. I will have more to say on Personal BASIC once I've had a chance to use the release version, but for those of you who can't wait, the October issue of BYTE magazine had a number of detailed comments by Jerry Pournelle on the product.

DRI C Compiler

This still hadn't cleared customs by the deadline for this column so I can only comment on what I've seen in the manual. The Compiler supports several memory models, which allow various combinations of code and data areas. There is enough flexibility in the choice of memory models to cover most conceivable applications. Basically you can

have a choice of a lot of code space and just one segment of data space or one segment of code space and lots of data space.

Only object code produced to suit the small-memory model will load and execute directly. The object code for the larger models must be loaded with a command loader package before it will execute. The C Compiler defaults to the small-memory model unless another memory model is specifically requested as an option on the compiler command line.

The documentation is good and includes a copy of K&R (otherwise known as 'The C Programming Language' by Kernighan and Ritchie), which is the standard reference text. Differences between the K&R text, UNIX version 7 compilers and the DRI C compiler are carefully noted in the documentation.

CP/M+ Again

I have only had a handful of responses to my request for CP/M-Plus users to stand up and be counted. Of the six users who contacted me, four were computer dealers or worked for computer companies, while only two were actual end users.

Thanks to those who took the trouble to respond.

Mail

I have a lot of unanswered mail from readers of this column. I have always been a terrible correspondent so please forgive me. I hope to reply to most of the requests for information over Christmas. Those letters requesting copies of the RCPM Connection Notes (despite several warnings in this column that they were no longer available) went straight into the wastepaper bin, so don't expect a reply.

I am really only set up to handle electronic mail now. You'll get a much quicker response to a question if you leave a message on my RCPM system.

Software Tools RCPM Relocates

The Software Tools RCPM system will be relocating soon. The system will probably go off-line sometime in the week starting November 7. The Boltons are moving house and as this is a long and complicated procedure (some of you know why) it will probably be the end of January before the system surfaces again. The new location isn't certain yet but I should be able to give you some idea next time.

Other PAMS News

Oops, the PAMS numbers list had a few errors. The list below has been carefully checked and is correct as far as I can tell. Several systems have recently been receiving international calls from places as far away as Finland and the UK, and some Australian users have tried to log onto one of the UK CBBS systems (**CBBS North East**) but have had a lot of trouble getting sufficient carrier level back from the UK, even on OTC data lines.

The **Micom CBBS** will soon be running on new hardware. The new configuration will give MICOM the capability to go to multi-user access in the future at an affordable cost per extra user, though the new hardware will initially only support a single user.

A new RCPM system, the **Tardis RCPM**, is now on line in Melbourne. I can't publish the number here yet but you'll find it on most of the other RCPM and CBBS systems. They are running a 16M hard disk and have SIG/M volumes 93 through to 125, plus some other material available for downloading on request.

Brisbane can expect to have its first RCPM early next year. From the number of Queensland users who log onto the Software Tools RCPM, it should be popular. That only leaves South Australia, Tasmania and the Northern Territory to go. I know the South Australian Micro Group has been thinking about it for a long time, so how about some action?

Newcastle users who are interested in seeing an RCPM in their area should contact the Newcastle Micro Club and express their interest directly. □

PAMS Numbers

Mi Computer Club BBS (MiCC-BBS): (02) 662-1686 24 hours EST
Software Tools RCPM (ST-RCPM): (02) 997-1836 24 hours EST
Micro Design Lab RCPM (MDL-RCPM): (02) 663-0151 24 hours EST
Sydney Public Access RCPM (SPA-RCPM): (02) 808-3536 24 hours EST
Melbourne CBBS (MICOM-CBBS): (03) 762-5088 24 hours EST
Sorcerer CBBS (SUGA-CBBS): (03) 836-4616 24 hours EST
Gippsland RCPM (GL-RCPM): (051) 34-1563 24 hours EST
Perth RMPM (WA-RMPM): (09) 381-6070 6pm-9pm WST.

your MICROBEE computer

By Richard Pakalnis

HELLO AND welcome back. A review, some letters and a few tips to get us going this month. First an overview of Mytek's new word processor for the MicroBee ...

ABCs With Ease

Well, Mytek has done it again! I have just received a copy of the word processor package from the State of the America's Cup and what a little wonder it's turned out to be.

Being a Wordstar user in my normal duties and used to referring to a bulky 200-page manual made me think that Mytek had left out the documentation. But lo and behold, there in its beautifully presented vinyl case were the thirteen little pages I was looking for.

Getting Started

Is it easy to use? You bet your sweet escape key. Just LOAD it and wait. The program is written in efficient Z80 code and loaded a lot quicker than I expected. No time to make a peanut butter sandwich at all. The intro from the fragmented Big M and then straight into the word processor. Here similarity with most other WPs stops.

Sure it's got normal cursor controls to move you round the screen. It's got the ability to insert, move blocks, word wraparound and lots of the other little goodies.

It wouldn't be a word processor if it didn't.

But here are the differences. The screen is configured to display text just like a typewriter does. You type the lines and they scroll up – just like a typewriter. The text scrolls up and down and the cursor remains in the middle of the screen. That makes it very easy to find.

There are two MODES of operation:

Typewriter

This word appears on the top left of the screen to let you know that you are in that particular mode and can do all those things we spoke of earlier.

Then there's:

Control

Now this where this WP shines. CONTROL is used for major text changes as well as the input/output commands – not forgetting the print options which we'll discuss later.

The CONTROL mode allows you, using single-character entry, to perform a myriad of functions such as (A) Move the cursor to beginning of text (A, the beginning, get it?); (B) Return to BASIC;



(C) Clear text buffer; (E) Erase and so on. The beauty of this is the use of alphabet style prompts.

Print Option

This is the printer initialisation function. No more control characters at the beginning of text – these are all put away in a separate working area. Even the erasure of the file at your command will not change the printer instructions. What printer instructions, you say? Those instructions which tell the system what type of printer you have, how many lines to a page, line feeds per carriage return, indent spaces, justification right and so on. The cursor leads you through as you input your requirements.

You then hit CTRL 'E' and RETURN to 'typewriter' and away you go. The manual explains all the printer options, but yours truly still managed to blow it. The PRINTER TYPE option is the same value as the BASIC 'OUT #' command, so I tried 1, 2, 3 and 4. No print. Rang Mytek and said: "...Your program she no good." Patient reply "...Try 5." I've never been so embarrassed. Just goes to show ... when in doubt, read the manual.

Enough

I could go on *ad nauseum* about the Macro commands, Search and Replace routines, Block moves and all the other features. It's definitely the best little word processor for the money. I'm replacing my WordBee with this one for the simple reason it is so easy to use. Mytek has produced another winner.

Price? Too cheap in my opinion: cassette-based, \$35.00; EPROM, \$39.00.

What's that I hear you say? You'll take two?

BIOS And The Bees

Now for a letter from Nicholas Martin from Ryde NSW about a small problem he had and a comment about software on disks ... "I recently upgraded my Bee to CP/M and would like to notify other users of a BIOS problem. When I tried using 'Disk Format' to read CCS format disks I found that the sector skew table relating to this format had nothing in common with the CCS disk I was using. After examining this disk with the monitor command 'YR', I found a skew of 6. Armed with this information I have worked out the following sector translation table:

1,7,13,2,8,14
3,9,15,4,10,16
5,11,17,6,12,18

Since patching the BIOS with this new skew information I have no problems with my friend's CCS disks at all. How Applied Technology came to specify their current CCS format I do not know. I do know my friend's system has not been modified and is reasonably 'current'. It would be a pity if other people imported software on CCS disks from America only to find they could not load it.

Talking of software, I have found that no one is willing to supply MicroBee programs on disks. Perhaps it is felt that pirating is too easy or that demand is too low. This policy is depriving system owners of the excellent graphics games and other machine-specific software which is virtually impossible to copy from tape to disk. I wonder if public pressure could alter the distributor's outlook on this matter."

Well, all you out there, what do you want? Do you want Microbee-specific software on disk? Just drop me a note c/- the mag and I'll pass your letters on to Applied Technology and get a statement.

User Group News

For the December issue we have compiled a User Group listing, not only for the MicroBee but for all systems. So if you're new or if we haven't mentioned you in a long while, drop us a line quickly and we'll get you in.

And just to start us off a few updates on some user groups which might be in your area.

Blue Mountains Microbee Computer Club

The club's aims are to cater for all the Bee owners in the Mountains area. At

present they have fifteen members after only two meetings. They meet on the first, third and fifth Fridays of each month and costs and formalities are kept to a minimum. Interested parties should ring Roger Cooper on (047) 58 7238 at any time.

(I went to one of their meetings and a nicer bunch of people you'd never meet. Thank you for your hospitality.)

Western Australia

A quick note from Mike Oborn, Secretary of the MicroBee Users' Group of WA, to say that at the last meeting in Perth, the forty or so members decided to formalise their existence by electing office bearers and a committee. (*A camel is a horse designed by a committee, you know - RP*). Meetings are held on the first Sunday of each month from 7-9 pm at Sir Charles Gairdner Hospital, Shenton Park.

Call Mike for details on (09) 447 5366 between 7-10 pm.

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Cat. XE-7020

WORD PROCESSOR - MYTEK

Micro Word processor comes with a quality ring binder and features most of the commands of the highly acclaimed SPLELBINDER. Mytek Word processor is screen oriented and re-formats the screen to 32 lines, allowing twice the amount of text to be displayed at once. Commands, which are all single keystrokes, include APPEND, BACK, CLOSE, DELETE, EDIT, FORWARD, HOLD, INSERT, NILL, LINE LENGTH, MISMATCH, OPEN, PRINT, READ, SEARCH/REPLACE, TOP, UNHOLD, VERIFY, WRITÉ and EXIT. Mytek Word processor is not a slavish thing. Although simple to use, it is one of the most powerful cassette based word processors currently available on any microcomputer.

Cat. XE-7015

TWO 4K EPROMs

\$50.00

Cat. XE-7016

OR 80K ROM

\$39.00

Cat. XE-7017

MUSIC B - MYTEK

\$39.00

MusicB is a music composer/editor that lets you create and save music and sound effects with a flexibility that makes chopsticks of the Basic PLAY command. MusicB is a great way to learn and play music! Comprehensive instructions are included.

Cat. XE-7010

TRS-BEE - MYTEK

\$20.00

TRS-BEE is a package of three programs that loads TRS-80 Model 1 and 3 program tapes into the MicroBee without any additional hardware. Although some program editing will still be required prior to their running, the majority of program typing time is saved by TRS-BEE. The first program loads TRS-80 BASIC programs into the MicroBee's BASIC memory and then calls them up. The second program loads all TRS-80 machine code into MicroBee memory. The third program loads TRS-80 assembler files into the MicroBee EDITOR/ASSEMBLER. Any TRS-80 Model 1 or 3 tape may be loaded. TRS-BEE opens up a whole new world of possible software on your MicroBee!

Cat. XE-7005

VIPER

A graphic game where you are a fast moving snake, and you must devolve the randomly appearing rabbits to score points. Sounds easy, but your tail grows longer with every rabbit you eat!

Cat. XE-7042

NEW

\$14.95

HOUSEHOLD REGISTER

This program will simplify the task of determining the value of your home's contents for insurance purposes, as well as providing descriptions of all listed items in the event of their loss or destruction. Effects are catalogued by name, description and value. Nine separate rooms are provided, and up to 28 items in each may be listed in each.

Cat. XE-7000

\$14.95

STAT PACK - STATISTICS

This program is a general purpose graph plotting, linear regression, line of best fit and correlation program. It features a t-test of significance for the correlation coefficient and, if no evidence of correlation is found, a determination of minimum sample size is performed.

Cat. XE-6999

\$14.95

EYE OF MIN

This is a challenging 32K adventure. The aim is to find the highly prized jewels and to help you do this you have a map constantly displayed to guide you. An excellent game.

Cat. XE-7025

\$14.95

HOPPER

A MicroBee version of the well known arcade FROG game. First you must cross a highway to get to the river, where you must jump from one moving log to another to get home. You are also racing against the clock. Excellent graphics.

Cat. XE-7023

\$14.95

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\$14.95

NEW

A MicroBee version of the well known arcade FROG game. First you must cross a highway to get to

your VIC 20/C64 computer

By Andrew Farrell

MUCH CONFUSION has grown around the fate of the 1526 printer, which was recently withdrawn from sale by Commodore. Several problems with software compatibility seem to be the main reason for the move, and I've been told that a powerful new ROM will also be included in the re-released version to allow full graphics capabilities.

In the meantime Commodore has just released a replacement for the 1525 graphic printer, which will still retail at \$399. I only managed to have a brief look at one in Computerwave in Sydney, and it appears to have some nice improvements. The casing now has a very low profile, and the colour matches the C64 well.

The print speed has been increased to 50 cps and a linefeed button added (unfortunately a touch-sensitive job) along with an additional serial port.

Function Keys

Several users have inquired how the function keys may be used or assigned on the VIC-20 and C64. The manuals in-

cluded with each computer treat this subject fairly lightly, although the appendix does supply the necessary information.

The function keys produce an ASCII value from 133 to 140 and may be tested just like any other key by checking for the above values.

This usually limits their use to things such as 'Press F1 to start'. Many games use Function 1 as the start key and other function keys to provide pause, restart, and level selection.

Several cartridges allow the keys to be assigned any operation, such as RUN or LIST (Simon's BASIC on the C64; Super Expander or Programmers' Aid on the VIC). To do this normally would require a short program in machine code that checked the CHAR-GOT routine for the function keys and produced the necessary commands.

Zork I, II and III

The famous disk-based text adventures by Infocom have been released for the C64 by Commodore. The game is

unique in its size and incredible vocabulary of over 600 words. Zork also understands complex sentences, which helps make it a pleasure to play.

I spent most of the recent long weekend playing Part One in the series and I'm still trapped ... anyone know how to get west of the timber room?

CP/M ...?

Many people will tell you the world of computers starts and ends with CP/M, the incredible operating system at home in a Z80 computer. The C64, as the advertising boasts, has the ability to run a second microprocessor, so the existing 6510 may be easily switched out and a Z80 cartridge inserted in the expansion port, thus allowing you to run CP/M on your 64.

The manual claims: "...lets you use over 15,000 CP/M programs...". When and from where this incredible supply of CP/M software will arrive still remains a mystery — even existing programs can't be downloaded due to the absence of an RS232 driver in the system.



**At last, the first joystick
that puts the firing button
where it should have been
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This unique durable joystick is compatible
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So what can you do with CP/M? Well, to be honest, as it stands now, very little. The cost of adding the necessary hardware and software has recently increased to around \$140. Even if good business packages become available, 6510 programs would still be cheaper and more efficient.

All in all, CP/M appears to be an expensive addition for what it can do. Including a version of MBASIC would have been nice, and compatibility with existing software is a must. In the meantime mine will sit on the shelf and collect dust.

Cassette Improvements

The latest batch of cassette players is now well-shielded from the interference caused by TVs, disk drives and other nasties. For owners still experiencing bad loads, the problem definitely exists, so keep your Datasettes as far away from the above-mentioned devices as possible (in fact, away from anything producing a strong magnetic field).

By the way, normal audio cassettes are exactly the same as those used by manufacturers and computer buffs worldwide, so don't go spending lots of dollars on so-called 'computer verified cassettes'.

The main problem which occurs is due to the existence of a leader on most normal cassettes. The long beep which is recorded by the Commodore at the start of a program is often lost on those first few centimetres of tape, thus causing bad loads. Therefore when using normal cassettes be sure to wind the tape past this section first.

Several brands of 'leaderless' cassettes also employ an equally nasty cause of errors. Often a magnetic leader is used, which appears to be normal tape. Where the leader and tape are spliced a slight drop-out occurs that may be enough to cause a bad load.

More Software

Imagineering has released several new games and business applications on disk for the C64, including 'David's Midnight Magic', 'Snakebite' and a spreadsheet called Omnicalc. All should be readily available in the next few weeks.

Also watch for new releases from Ozi Soft of around twenty new programs for both the VIC-20 and C64. Amongst the Australian programs is a great version of Pacman on the standard VIC-20 called 'Macpan'!

Macpan is written in full machine code and has brilliant sounds and graphics for a standard VIC-20. You may choose from eight speed levels, ranging from very slow to extremely fast.

Basically it's a full version of an old arcade favourite. How the author did it on a standard VIC-20 shall remain a mystery, but at \$19.95, Macpan should be very popular.

By the same author is an entirely original game called Cops and Robbers. In this game it's your turn to play the baddie, in a raid on the Acme Diamond Company.

Your mission is to collect the diamonds scattered throughout the five-level building and return them to your car – but the boys in blue are on your tail and you only have a limited supply of bullets.

Cops and Robbers is very addictive. I had to literally remove several guys from my VIC-20 to get a go at it myself. Top points in all areas, retailing for \$19.95.

G-Pascal

Thanks to the efforts of Gambit Games, the wait for another high level language for the Commodore 64 is over. Officially released earlier this month, G-Pascal should now be available from most dealers for around \$79.95.

The language is a self-contained Pascal subset with 76 extensions to support graphics, sound and other features unique to the 64.

Each package comes complete with an extensive 80-page manual, several demo programs and the G-Pascal compiler on either disk or cassette.

A brief look at the manual provides a good indication of G-Pascal's potential with full commands for features that

would otherwise require an expert program in full machine code.

Incidentally, one of the most interesting features is that G-Pascal is a totally Australian-designed and written product. Having recently seen some of the latest US and British software I believe G-Pascal will rank very highly among overseas material.

For those of you interested in the specs, G-Pascal compiles over 6000 lines per minute, includes a built-in text editor with search and replace facilities, has various debugging aids and supports machine code subroutines.

The following standard Pascal constructs are allowed: PROCEDURE, FUNCTION, WHILE, DO, REPEAT, UNTIL, FOR, IF, THEN, ELSE, CASE, BEGIN, END, READ, WRITE, WHILE, VAR, CONST, INTEGER, CHAR and ARRAY.

Commands such as VOICE, JOYSTICK, SCROLL, GRAPHICS and WRITE are among the 76 extensions which will be of interest to most users, especially arcade game programmers.

Overall I think G-Pascal fills a big gap and may possibly even be worth considering as a substitute for Simon's BASIC. The system is very easy to use as some operations are entirely menu driven.

Generally speaking, it is relatively crash proof, with thorough idiot error checking and very fast disk operations.

By next month I may have made a little more progress learning Pascal (one night wasn't quite enough), so I'll let you know how G-Pascal rates in the proving trials.

Don't forget Sydcom 64 (Sydney C64 Users Group) meets on the first Tuesday of each month in the city. Write to Sydcom 64, P.O. Box 173, Miller 2168.



your APPLE computer

By Peter Sandys

RECENTLY there was a request for a way to convert Integer BASIC programs to Applesoft. I received a letter from Simon Walmsley and Richard Bennett, both from Pymble in NSW.

Simon and Richard wrote, "The problem in converting lies essentially in loading the Integer program into Applesoft so that it can be changed, and there are two ways in which this can be done. The first comprises changing the file type flag on track 11 from the:

- I - Unlocked Integer File (1H), or
- I* - Locked Integer File (81H)

to

- A - Unlocked Applesoft File (2H) or
- A* - Locked Applesoft File (82H)

thus enabling the program to be loaded into Applesoft. (You will need a program like Disk Fixer, or Bag of Tricks' Zap program.)

Unfortunately, conflicting BASIC token values exist between the two languages, for example:

- In Integer the token for END is 51H
- In Applesoft the token for END is 80H

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There would be no problem loading the program in, but the tokens would be different, so that when the program was LISTed, every END that was in the Integer program would become a Q. In the same way every token would become either another keyword, ASCII value or letter. Therefore it is necessary either to write a machine language routine that converts all the tokens to those of Applesoft, or find an alternative method of LOADing the program without loss of keywords. The latter can be done simply by:

1. LOADing and RUNning a program called Integer (26 sectors long and available from any Apple Users' Group), and then LOADing the program to be converted.

2. Then add these lines to the beginning of the program:

1 DIM N\$(35): N\$ = "NAME OF PROGRAM TO BE CONVERTED" + "A."

2 D\$ = CHR\$(4) (N.B. Integer does not accept CHR\$ so enter "Control d" - that is, press control and d key within quotation marks.)

3 PRINT D\$; "OPEN", N\$: PRINT D\$; "WRITE", N\$: LIST : PRINT D\$; "CLOSE", D\$: END

3. RUN the program, thus creating the textfile of the program.

4. Reboot the disk with Applesoft, and EXEC the Textfile.

5. Delete lines 1, 2 + 3.

6. Change all non-compatible syntax to Applesoft. Most are easily done but Integer does not use graphics commands (HGR HGR@ and so on), but instead uses CALLS POKEs and the like. In the Autostart ROM with Applesoft, these locations are different, so here are the conversions.

0	1-3,5-7
1	0,3-4,7
2	0,3-4,7
3	0-2,4-6
4	1-3,5-7
5	0,3-4,7
6	0,3-4,7
7	0-2,4-6

Simon and Richard did not give examples of the differences in BASIC so I have included a list of the differences between the two. This list is not complete but it will be a good starting point.

IF Statements

Integer:

10 IF Y THEN 100 : GOTO1000
Applesoft:

10 IF Y THEN 100
20 GOTO 1000

In Integer, if the statement is false then the program reads the next statement after the colon. Applesoft causes the program to jump to the next line.

Random Numbers

Integer: 10 Y = RND(6)
Applesoft: 10 Y = 6 * RND(1)

Input Statements

Integer: 10 INPUT "YOUR NAME", A\$
Applesoft: 10 INPUT "YOUR NAME"; A\$

Integer uses a comma, Applesoft uses a semi-colon.

Not Equal

Integer: 10 IF X#Y THEN 100
Applesoft: 10 IF X <> Y THEN 100

Tab

Change TAB in Integer to HTAB in Applesoft.

DIM

Integer: DIM A\$(15) means one string 15 characters long.

Applesoft: DIM A\$(15) means 15 strings of any length (max. 255 characters)

Home Accountant

A second letter I've had for some time is from Jim Sloane from Toowoomba in Queensland. Jim writes that he has had trouble with the Home Accountant program and the Epson printer with Epson's interface card. He says "... I have had trouble getting the Epson to tab properly, using several pieces of software. When in a state of complete frustration with the thing I happened to try 'CHR\$(0)' as one of the printer commands, and guess what, it worked!" Jim enclosed a copy of a program which is used as a preboot to the Home Accountant.

I know of a few people who have experienced the same problem as Jim with the Home Accountant and the Epson, so I was extremely happy to receive Jim's fix. Regrettably I lost (misfiled) his letter until now! It would be interesting if this fix could be used to solve the problems the Epson interface has with DB Master.

Rather than print the whole program, which would involve some considerable retyping by my two overworked fingers,

I have extracted the two magic lines (which Jim was kind enough to identify for me in his covering letter). These are:

```
PRINT CHR$(0)  
POKE 1657,80
```

These should work if you turn on the printer, then send them direct to the printer by first activating it (PR#1 if in slot 1), then typing in the above commands directly from the keyboard. Then activate the disk drive (PR#6) which has the Home Accountant disk in it.

Colour Graphics In Black And White

Whilst reading some old magazines I came across an interesting titbit in 'Apple Orchard' by Tom Jacobsen. The article discussed the problems of graphics programs which are written in colour and then run on black and white monitors.

Tom found that some colour combinations are indistinguishable when run on a monochrome screen. He produced the table below as a guide for programmers

to use to assist them. With Apple packaging its systems with the Apple III or Apple II monitors, the need to write graphics programs that can be distinguished on monochrome displays is even greater now.

CALL	CHANGE	TO
62446		62450
-3089		-3085
62449		62451
-3086		-3084
62445		62449
-3090		-3086
62476		62481
-3059		-3054
62546		62550
-2989		-2985
62767		62777
-2768		-2758 "

The Plot Doubles

Apple has now started to supply more



of the accessories the average Apple user needs for his or her system. Examples of this are the two monitors, the DMP (dot matrix printer), and the LQP (letter-quality printer). The quality of the printers is exceptional.

However, Apple is not stopping here; there are more new products to enhance the capabilities of your Apple. When I can I will advise you of these, but the prototypes I saw are of good quality and will be in great demand. □

Sendata 300 Modem Direct Connect

A new direct connect 300 bps modem that is no taller than a 50c piece and fits snugly under the base of a telephone, has been released by Australian communications manufacturer, Electromed. Called the Sendata 300 the modem is simple to operate and does not require operator training. It attaches to the existing telephone wall socket with the flick of a switch by the operator.

- No installation costs.
- Simple operation.
- Fits under telephone base.
- Attaches to existing telephone plug.

SEN DATA

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TELEX: AA34008

your IBM computer

By Lloyd R Borrett

WHEN THE IBM Personal Computer XT was released back in March '83, IBM said that while the PC1 and XT were aimed at the same market, they expected the XT would erode the PC1's market share. Obviously, with 10 Mbytes of hard disk, the XT was aimed at those users with higher storage requirements. It seems that, as for the PC1, IBM totally underestimated the market for the XT.

In the US there is at least a six-week wait for the delivery of an XT, and the situation is not any better in Australia. Even with cash in hand it is difficult to get hold of an XT.

PC1 Expansion Units

By the time you read this, it may be possible to get hold of IBM's Expansion Unit for the PC1. Of course you pay more for this way of turning a PC1 into an XT equivalent. How much more? Well, consider a PC1 and an XT, without peripherals, but expanded to a useful configuration:

PC with 64K memory, 360K diskette drive: \$3429

Expansion Unit PC1: \$5325

AST Research MegaPlus 256K memory, calendar/clock, two serial ports, one parallel port: \$700

Total: \$9454

XT with 128K memory, one serial port, 360K diskette drive, 10 Mb hard disk: \$7892

Additional 128K memory: \$200

Total: \$8092

So the figures show you will pay \$1362 more, and that is after using careful purchasing options to obtain a 'discount'. (See September '83 column for more details about the AST Research Megaplus.)

Note that I do not advocate paying IBM's price of \$502 for 128K of additional memory. The eighteen 64K chips required can be purchased for \$7 to \$8 each, so you can purchase and install the chips yourself, or there is more than one dealer around who will supply and install them for about \$200.

An Australian XT Alternative

Col Davis and the staff at CPU Computer Centre, Clayfield, Brisbane, have developed an eXTended Australian Version of the PC1 called the PC Plus-10. The product specifications are:

1. Standard PC system board (64K

RAM, floppy disk controller)

2. Slimline 360K floppy disk drive (drive A, 100 per cent IBM-compatible)

3. 10M internal Winchester disk drive (100 per cent IBM software-compatible)

4. Multi-function board with additional 64K RAM, asynchronous comms. adapter, parallel printer port, real-time clock/calendar, Winchester host adaptor (all 100 per cent IBM software-compatible)

5. Xebec Winchester controller mounted above half-height floppy.

6. Replacement power supply.

The PC Plus-10 does not function with option 3 of the IBM Diagnostics Diskette. Apart from this, Col Davis assures me that the PC Plus-10 functions and operates exactly as an IBM-XT. All DOS 2.0 commands relating to the Winchester drive operate as on the IBM-XT. All IBM-XT software will operate without modification.

Besides the diagnostic incompatibility, the only functional difference between the PC Plus-10 and an IBM-XT is that the XT has eight expansion slots while the PC Plus-10 has only five.

The PC Plus-10 has been demonstrated to IBM's PC Group in Sydney, and will only be sold via IBM dealers. A twelve-month warranty is given on the complete system, and the recommended retail price is the same as for the IBM-XT.

PC1 or XT?

People have often asked for my advice on how to decide between buying a PC1 or an XT. An important part of the decision has to be the price difference.

The price difference between a reasonably configured PC1 and the XT is \$3142 (take out the expansion unit from the figures presented earlier, and add a second 360K diskette drive). Of course it is possible to find other ways to add on hard disks to PC1s and save on this; however, to do so one must walk a very careful path. CPU Computer Centre's add-on hard disk implementation is the only one I have seen which offers full functional and operational compatibility.

Obviously there are applications which demand the availability of a hard disk. Some require the extra storage capacity, others the fast transfer rates, and of course there are always applications which need both. For all these applications, either you can justify the

additional expenditure or you can't.

But what about applications which could run on a PC1? Assuming the extra money could be raised, should the XT still be considered? The problem is now a little more difficult.

I see two main factors that should be considered, and the first is convenience. The storage capacity of the hard disk makes it possible to have all your programs, data and utilities available all the time – no more shuffling of floppy disks. Many first-time users, especially those buying the system for business use, are not prepared to put up with managing a collection of floppy disks.

The second factor is the provision of an expansion path. The computer system installed that doesn't require an upgrade to expand capacity after one to two years is rare. People always seem to underestimate their requirements.

With personal computers this seems to be even more of a problem. While the system may be purchased to perform one application, once the system is running other applications are always found. It costs \$5325 to add the expansion unit to an existing PC1, which provides a system with a second floppy disk drive now hardly used, but for which \$821 was paid. (I assume there would be very few PC1s sold with only one diskette drive.)

If the extra money is available, therefore, I would usually recommend that an XT be purchased. In most cases it means spending an extra \$3150 initially to save \$3000 in a year's time.

Unprotecting BASIC Programs

There are three options available when using the SAVE command to store a BASIC program. By default the program will be saved in a compressed binary (tokenised) format. By specifying the 'A' option the program is saved in ASCII format, which requires more space. The 'P' option saves the program in an encoded binary format. When the program is later run (or loaded), any attempt to LIST or EDIT it will fail.

There are obvious reasons why you would want to protect a program, and equally obvious reasons why you may wish later to unprotect it. Fortunately someone in the USA has found the solution, and made it generally available via user groups and bulletin board systems. The procedure is as follows:

1. Load BASIC or BASICA

2. Type BSAVE "LIST",1124,1
3. Load the program you wish to list, save, or edit.
4. Type BLOAD "LIST",1124
5. Now list the formerly protected program.

The first two steps will create a new program file called 'LIST'; you can use any other name you prefer. The program can be transferred onto other disks or simply recreated on each.

Many of the less expensive software packages are BASIC programs saved using the 'P' option. By unprotected them I have been able to fix problems and add enhancements. More than one package combined source protection with a disk copy protection mechanism. Using this tip it is possible to insert statements to branch around the protection code, thus allowing back-up copies to be made, and the programs to be used on DOS 2.0 formatted diskettes and hard disks.

Fighting Against Software Protection

I believe too much is made of the software piracy problem; many software companies are spending too much time and money trying to defend themselves against pirates. They reduce, if not ruin, the usefulness of their products with locked disks, unlistable programs, secret source code, codes in ROM chips, and so forth.

These devices have made many programs inefficient and costly to produce and support. We the buyers are greatly taxed because we cannot make modifications or back-up copies of the programs we have purchased. Often we are inconvenienced by added expenses for back-ups and future modifications.

Instead of paying each supplier for a back-up copy, I advise you to purchase a program such as Copy II PC. This is an IBM disk copy program from Central Point Software, which can be used to back-up many 'protected' programs. Unfortunately Copy II PC will not copy the Lotus 1-2-3 Release 1A system disk, but I'm sure there will eventually be a way around that.

Let me make it quite clear that I do not advocate software piracy. You should think twice before accepting stolen software from friends; the result of illegal copying is more expense and less convenience for everyone.

The sale of software is just that - the

sale of programs, listings, source code, and back-up capability - a complete sale. Currently we are forced to buy a disguised lease. For the money we spend we are entitled to software which is as useful as possible. If you are not satisfied with a program, write and tell the author or publisher the nature of the problem, and even suggest possible solutions. You may be pleasantly surprised as to how effective this can be.

The User-Supported Software Concept

A company called The Headlands Press, Inc. has started up an experiment in distributing computer programs called the **Freeware** user-supported concept, based on three principles:

1. That value and utility of software is best assessed by the user on his/her own system.
2. That the creation of personal computer software can and should be supported by the computing community.
3. That copying of programs should be encouraged, rather than restricted.

The user-supported concept allows anyone to request a copy of a user-supported program by sending a blank, formatted disk to the author of the program, with an addressed, postage-paid return envelope. A copy of the program, with documentation, is then sent by return mail. The program carries a notice suggesting a contribution to the program's author. Making a contribution is completely voluntary on the part of each user.

Regardless of whether a contribution is made, the user is encouraged to copy and share the program with others. Payment for use is discretionary on the part of each subsequent user.

Up to now, distribution of software has relied either on restricting access (and charging the cost for doing so), or anonymously casting programs into the public domain. The user-supported concept might - just might - be a way for the computing community to support and encourage creative work outside the traditional marketplace.

This is an experiment in economics more than altruism. Free distribution of software and voluntary payment for its use eliminate the need for money to be spent on marketing, advertising, and copy protection schemes. Users obtain quality software at reduced cost, while still supporting program authors. They

can try it out before buying, and do so at their own pace and in the comfort of their own home or office. And the most useful programs will survive, based purely on their quality and usefulness.

All software authors are invited to participate in this distribution concept. The Headland Press Inc. is publishing a **Freeware Catalog** of user-supported software by program authors who are willing to make their work available on a free, non-restricted basis.

The experiment has been running for about a year now, and appears to be working. **Freeware** user-supported software is available via the authors, user groups, and remote bulletin board systems. To my knowledge all the software currently available is designed to run on the IBM Personal Computer, but no doubt others will take up the offer.

The **Freeware** user-supported programs I have obtained are:

PC-TALK: a communication program.
PC FILE: a database manager program.

CROSSREF: cross-reference utility.
MONITOR: screen-user interface utility.

EXP LIST: expanded lister utility.
All these programs are well documented, and some compare favourably with \$200-plus packages available via retail stores.

Other Free Software For The PC

The New York Amateur Computer Club (NYACC), which previously published catalogues of CPMUG and SIG/M libraries, now also distributes the PC/Blue User Group Library.

The primary source of programs for the library is material extracted from the CPMUG and SIG/M libraries, some of which still requires conversion to be usable under PC-DOS or MS-DOS. Of the 28 diskettes I have obtained, eleven contain utilities and games which are immediately usable under PC-DOS. The **Freeware** programs came from diskettes. The volumes are on 13 cm single-sided disks. There are no plans to support CP/M-86.

By the time you read this I hope to have made arrangements for these disks to be distributed in Australia. I will leave a notice on the MiCC Bulletin Board when details are finalised, and a full announcement will be included in my next column (*Your Computer*, January 1984)

SOFTWARE FOR SINCLAIRS

An impressive and growing range of software for ZX SPECTRUM, exclusively developed and marketed in Australia by Gloster Software, now joins the famous ZX81 range. Marketed under licence in the UK and elsewhere, the software has already received high critical acclaim overseas.

- Our famous "ADVENTURE IN TIME" has been expanded and upgraded to three linked programs for 48K ZX SPECTRUM.
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- Naturally we have a pack to allow ZX81 programs to LOAD straight into ZX SPECTRUM (no hardware), just as we have the ZX80-to-ZX81 loader.
- Two graphic tool kits, including the revolutionary "SPECTRUM SPRITES" software—UDs of any size or shape, any number living in string variables, can be placed on screen with pixel accuracy and be moved or re-moved without disturbing original screen contents. Many other features makes this one arguably the most significant contribution to spectrum graphics to date!

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DISASSEMBLER: Another one? But this is in Basic so you can see how it works and features labels and protection of data areas (no-one else has these!) Makes understanding Z80 a breeze. 16K (label option needs 32K). Cassette and instructions - \$15.00.

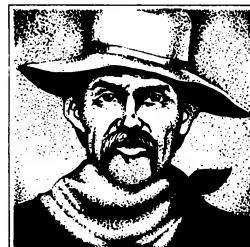
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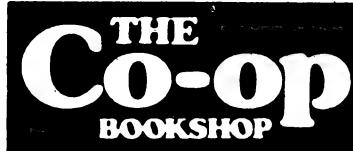
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your OSBORNE computer

By Steve Townsend

HERE'S A SIMPLE way of modifying WordStar so you can make use of your printer's fancy features like shadow print, expanded print, superscript and so on.

Printers need to receive certain codes before they will switch to their special printing modes. Many printers use 'escape codes'; that is, the computer sends the ESC character followed by some other character(s). Wordstar can't be expected to know which codes your particular printer requires.

However, these codes can be embedded in your text by modifying WordStar with the INSTALL program provided on your CP/M utilities disk.

So, let's assume that: (1) your printer uses escape codes, (2) it works all right in its standard printing mode, (3) it isn't one of the printers already catered for in the INSTALL program (Diablo, Qume and so on).

This method was devised for a C.Itoh F10, but it is applicable to any printer using escape codes. What it does is 'wrap' the ESC character in the user print control character, Q. This allows you to embed the ESC character followed by the code character(s) in your WordStar text.

First, have a look at Appendix A in your Osborne manual, which tells you how to use the INSTALL program to modify WordStar. It's pretty heavy stuff but you don't need to learn it all. Just read enough to learn how to get the INSTALL program started on your WordStar disk. Make sure you do this on a back-up copy.

The following is an abbreviated list of the questions INSTALL will ask you. The characters in bold should be your response.

First time INSTALL? N

Option? B

Filename? B:WS.COM

Filename for saving? B:WS.COM

Terminal menu option? U

Sure? Y

Printer Option? U

Sure? Y

Protocol option? U

Sure? Y

Driver option? U

Sure? Y

Modifications now complete? N

Location? USR1:<return>

New Address? 1<return>

Location to be changed? <return>
Value of new address? 1B<return>
Another location? 0<return>
OK? Y

That's it. Your WordStar program will now send an escape character whenever it sees a ↑Q. To embed this in your text you enter ↑P↑Q. (In the same way ↑P↑D embeds a ↑D in the text.)

Suppose your printer needs to get 'ESC L16' before it will switch itself to double line spacing. You simply enter ↑P↑QL16 wherever you want it in your text. Likewise shadow printing might need a ↑P↑QW to start it up and a ↑P↑Q to switch it off.

Special Points

Some printers won't recognise their special feature codes while in bidirectional printing mode. Switch to single direction printing before you try them out for the first time.

You will sometimes run into trouble if you nest some print controls in among others. That is, you can't always get an underline with a shadow print.

If your printer specifies an upper case character as the code, make sure you don't embed a lower-case character.

Many of the WordStar print control characters will work normally; for example ↑P↑D, ↑P↑S, will usually carry out their normal functions of double printing and underlining since they aren't dependent on the characteristics of the printer.

Two Drawbacks

This method has two drawbacks. For a start, you have to use more key strokes. For example, instead of entering ↑P↑V to start a subscript, you are going to have to enter ↑P↑QD (if D is your printer's code letter). I don't find this a problem. The only fancy feature I use frequently is shadow print, and I've automated that with control keys using the SETUP program.

The other drawback is that instead of having ↑V appearing in your text to indicate a subscript, you're going to have ↑QP. This can mess things up with justification since WordStar makes allowance for only one character after the '>'. (But don't worry, you'll learn to cope with it. After all, this is a simple method of modifying WordStar.)

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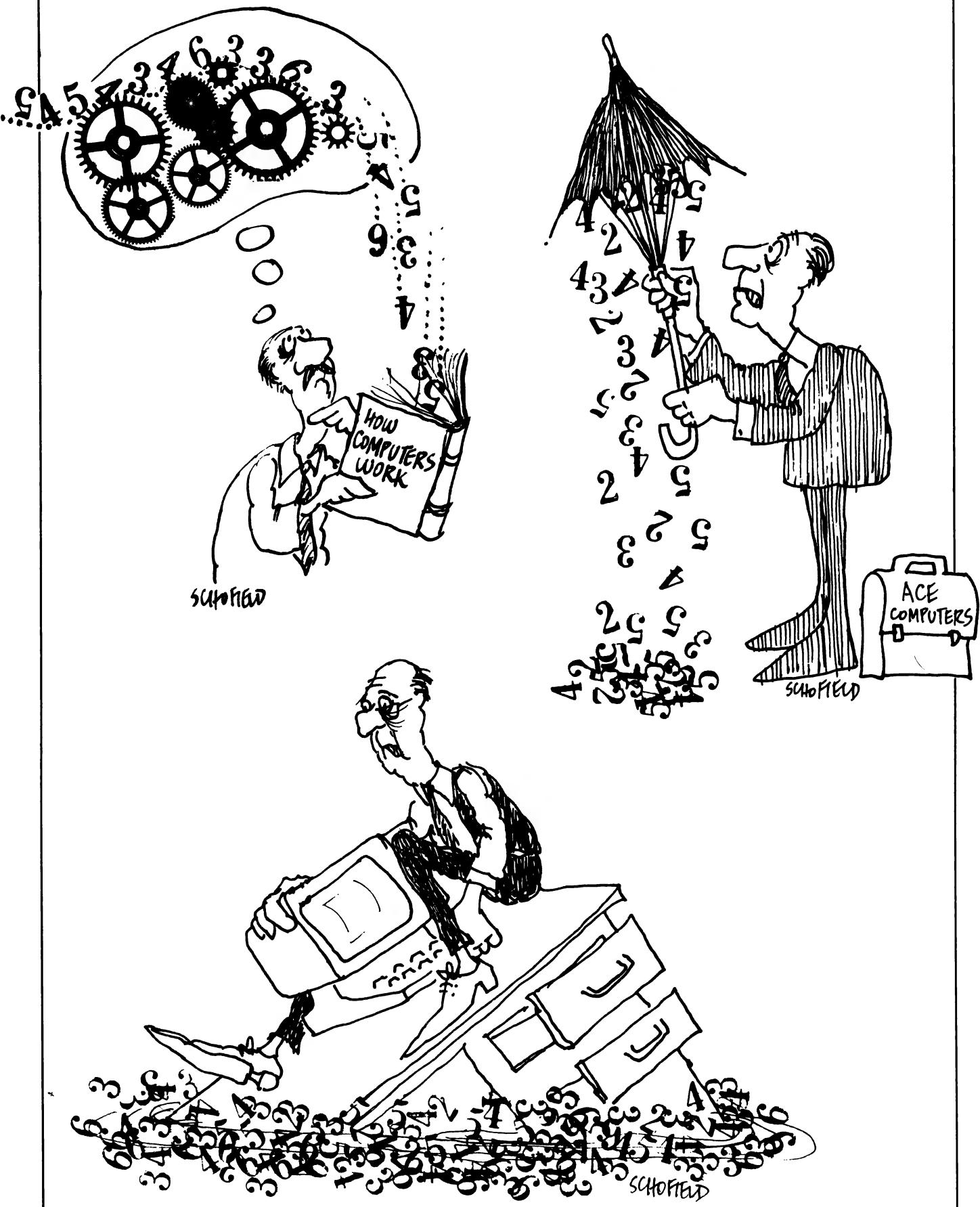
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your COLOUR computer

By T P Chen

GIDDAY! I got sick of looking for a 'Your Color Computer' column, so I thought I'd write one instead. Each month (or whenever the editor lets me in) I hope to review a commercial program, present a short program and maybe talk a little about CoCo (what's new and so on). So here it is, the all-singing, lemon-fresh Color Computer column.

Review – Polaris

'Polaris' is distributed by Tandy in the form of a ROMPAC. It is roughly based on the arcade game 'Missile Command', and the aim of the game is to protect your six islands from a continuous rain of enemy missiles. You defend your islands by exploding an anti-missile in the path of an oncoming missile. This is done by positioning your cross-hairs with the right joystick and firing a missile from one of your three submarines. The keys Z, X, C or <, >, / select which of the subs fires.

Each submarine is equipped with nine anti-missiles at the beginning of a frame. If you run out . . . tough! There are also 'smart' missiles which try to avoid your anti-missiles. Every 2000 points you receive a bonus island. The game ends when you have lost all your islands.

Polaris allows one or two players. In the two-player game, the players play alternate frames, defending their own islands.

I have only one gripe with Polaris, and that is the lack of any form of high score. It would be nice to be able to play a couple of games and know what your highest score was. When you finish a game your hard-earned score just disappears in a puff of title page.

The ROMPAC is accompanied by a booklet which explains the game in (too?) much detail. The graphics (equal to PMODE 3) and sound effects are excellent. For \$39.95 Polaris is a worthwhile purchase, though how much the pretty packaging contributes to that cost is another question.

Program – Turn!!

TURN!!, although not very original, is short, fast and challenging (frustrating?). Listing 1 is a Color BASIC version while Listing 2 is for those with Extended BASIC.

The game is very simple. You control a moving line which turns 90 degrees to the right every time you press a key. The line is not allowed to run over itself or off the screen; the game ends if either of these happens. You get one point every time you turn, and the trick is to cram in as many turns as possible.

The POKE&HFFD7,0 (65495) makes CoCo run double speed. If your CoCo crashes then leave it out. Remember to press RESET or POKE&HFFD6,0 (65494) before trying to use the cassette or a printer.

The EXEC&HA956 (43350) forms the buzzing sound. POKE&H8C,0 (140) controls the pitch of the buzzing, while POKE&H8D,0 (141) and POKE&H8E,0 (142) control the length of each click. In fact these locations are those used by

the BASIC command SOUNDp,d, and &HA956 (43350) is the command's routine in ROM. Listing 3 demonstrates some of the things that can be done with it.

If you have any problems with or questions about CoCo, send them to me:

T P Chen
6 Kooringa Crescent
Mulgrave 3170,
and I'll try to answer them. □

Listing 1 —

```
0 CLS:GOTOB
1 A=RND(8):CLSKAD:B=A*16+115:Y=R+V:FOR X=16/4 TO 1455:POKE X,B:POKE X+489,Y:NEXT
2 FOR Y=1 TO 3B:RESET(X,Y):RESET A,Y:FOR X=1 TO 142:POKE142,0:POKE140,20:POKE141,0:POK
E142,0
3 A=0:B=-1:X=1:Y=31:Q=1:S=0
4 EXEC43350:X=X+A:Y=Y+B:IF PPOINT(X,Y)=0 THEN S=S+1
5 RESET(X,Y):TF INKEY$<>" " THEN T=R:D=0:RET:GOTO4
6 GOTO4
7 CLS:PRINT"SCORE="S:PRINT"HIGH SCORE="" IF S>HIGH THEN H=S
8 PRINT"PRESS (S) TO START"
9 IF INKEY$<>"S" THEN9 ELSE1
10 GOTO10
```

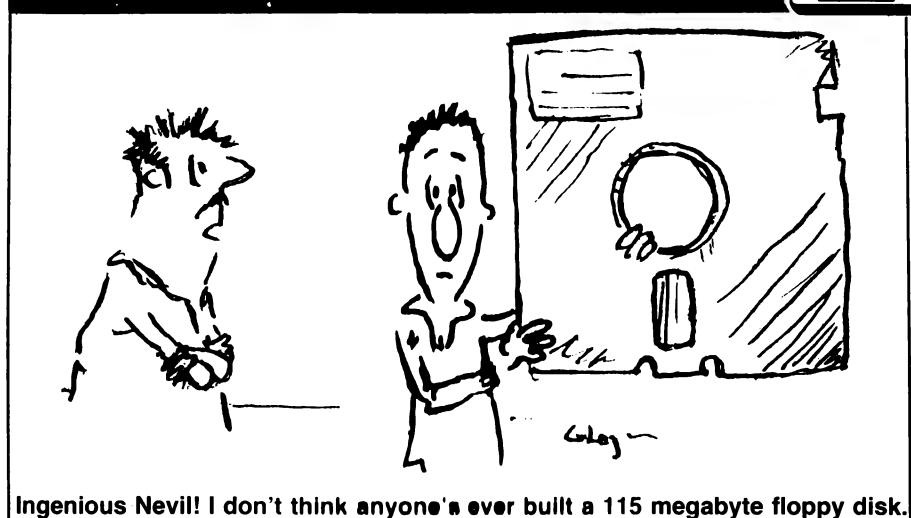
Listing 2 —

```
0 CLS:S$="DEG":GOTO7
1 PMODE0,1:PCLS1:SCREEN1,1:POKEWF107,0:PRINWF107,0:POKE&H8D,0:POKE&H8E,0
2 LINE(0,0)-(255,191):RESET,B,A=0:D=0:X=0:Y=191:Q=1:S=0:PLAY" L2504C03BAGFEDCL1
20"
3 EXEC&HA956:X=X+A:Y=Y+B:IF PPOINT(X,Y)=0 THEN S
4 PRESET(X,Y):IF INKEY$<>" " THEN T=R:D=0:PLAY S$:GOTO3
5 GOTO3
6 PLAY" L30CEG04C":CLS:PRINT"SCORE="":PRINT" HIGH SCORE="" IF S>HIGH THEN H=S
7 PRINT"PRESS (S) TO START"
8 IF INKEY$<>"S" THEN8 ELSE1
```

Listing 3 —

```
0 POKE65494,0 :.9 MHz CLOCK SPEED
1 F=140:EXEC43350
2 CLS:PRINT#263,"AND SAME TO YOU!!":H=255:GOSUB8:FOR X=A TO B STEP4:POKEF,X:
EXEC:NEXT
3 CLS:PRINT#266,"CAR COMING.":A=140:D=2:C=140:GOSUB9:FOR X=A TO C STEP-2:POKEF,X:
EXEC:POKFD,D:EXEC:NEXT
4 CLS:PRINT#266,"AH, BEE!":GOSUB9:A=174:D=147:POKE142,1:FOR X=1 TO 250:POKEF,A:E
XEC:POKEF,B:EXEC:NEXT
5 CLS:POKE65495,0:C=142:B=0:D=2:F=20:POKEF,A:D=0:R(0)=5:R(1)=58:R(2)=89:R(3)=1
33:GOSUB9:FOR X=0 TO 3:PRINT#9,"HUM":FOR Y=0 TO 1:POKE F,ACKY:EXEC:POKEF,D:NEXT:
D=27:NEXT:A=5:B=133:E=200
6 FOR X=B TO E:POKEF,A:EXEC:POKEF,D:POKEF,B:EXEC:POKEF,C:EXEC:NEXT
7 POKE65494,0:STOP
8 FOR T=1 TO 500:NEXT:RETURN
```

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Must Sell: System 80, 16K, with Dick Smith B&W monitor. Software includes Tiny Pascal, Editor Assembler +, Typing Tutor, with many games and books. Good condition, no problems. \$500 ono. Phone Nick ah (050) 23 3043.

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MicroBee Software: Xlotto selector uses special technique to choose Xlotto draws. Two programs and manual, \$9.95. Myles, 5 Pasadena Crescent, Pasadena 5042.

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For Sale: Dick Smith System 80 computer, 16K, manuals, as new, some software. \$440 ono. P.O. Box 17, Koorawatha 2807.

For Sale: ZX80 8K ROM, slow mode, inverse video, psu, VHF compatible, program cassette, \$100. Ring Stuart (02) 560 7050.

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Atari 800: 16K, BASIC cartridge and program recorder for sale. \$980, as new. A McFarlane, Box 519, Cobdogla 5346. Phone (085) 88 7144.

MicroBee Memory Map: The most comprehensive listing available to date. Over 300 addresses of firmware routines and functions. Plus parallel, serial and 50-way port data. 17 pages, \$3.50. Mail order to B. Proctor, 27 Roberts Ave, Mortdale 2223. Prompt return guaranteed.

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Kaypro User Group: Meets first Tuesday of the month in Adelaide. Contact (08) 223 6333 and ask for Myles.

Sutherland Super 80 Group: Recently formed informal group - for more information ring Jim Traeger (02) 525 2018 or David Naylor (032) 521 6092.

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Anti-glare Filters: One of each new, to suit Osborne and Kaypro computers. Will sell for \$19 and \$48 respectively. Write to 21 Sluman St, West Ryde 2114.

Apple II+ : 48K, 16K RAMcard, two disk drives, Epson MX80, Vision 80, green VDU, software, \$2600. Phone (049) 30 1148 ah.

For Sale: VIC-20, datasette, super expander, lots of books, over 100 games on cassette. Cost \$700, sell \$600. Phone (03) 376 9366.

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your KAYPRO computer

By Jeff Richards

LATEST VERSIONS of the KAYPRO II differ from the earlier ones in a number of ways. Perhaps the most obvious is that Microsoft BASIC-80 is now included as part of the software package, but there are several other changes that are of interest to owners of earlier models.

First, there has been a small hardware change. Apparently some disk problems were traced back to a problem with the 1 MHz clock used by the disk controller. A small change has been made to the clock divider IC to change the phase of the clock with respect to the CPU clock. The IC involved is U87, a 74LS390. You can tell if the change has been installed by having a look at U87. If it already has two small wire jumpers attached to its pins then you already have the mod and need proceed no further.

The change can be made with no modifications to the board at all, so if you feel nervous about making this change simply buy a spare 74LS390 before you start. If anything goes wrong insert the spare and you will be back to scratch. Before starting, arm yourself with a good-quality Philips-head screwdriver—the screws in the case are on so tightly that you risk damaging them if you use an inadequate screwdriver. In fact, removing the cover is the hardest part of the job.

The first step is to remove U87 and bend out pins 9 and 1. Pin 9 can be cut off. Solder a wire jumper from pin 1 to pin 6 and another from pin 12 to pin 15. Note that for pins 6, 12 and 15 this is a very delicate job, which involves soldering to the 'shoulder' of the pin and ensuring that solder does not flow down onto the part of the pin that will go back into the socket. U87 can now be replaced, being careful that the pins and jumpers do not touch adjacent components. Pin 1 does not go back into the socket.

As there is more room above the IC than alongside it, an alternative approach might be easier. This requires a 16-pin DIP header—the device that is used for mounting discrete components or jumpers into an IC socket. Hold the header in an old wirewrap socket that has been pushed into a piece of foam. This provides a heatsink and a work stand in one. Solder your 74LS390 to the header (except for pins 1 and 9) and run the jumpers from pin to pin. The header and IC can now be inserted in place of the original IC, which you can hold as a spare in case anything goes wrong.

This technique of mounting the IC in

a DIP header will be used for future mods, so you might like to lay in a small supply.

Other Problem Areas

There are a number of other possible causes of disk problems. Apparently some units were shipped without the correct 150 ohm terminating resistor packs in the drives. This resistor pack pulls the open-collector lines of the data cable high, and is supposed to be installed in drive B only. You can just see it with the drive mounted if the data cable is removed. It is the device that looks like an IC mounted in a socket immediately in front of the connector and towards the centre-line of the drive. The blank space in the A drive should be obvious.

The terminators were probably incorrectly placed when drives were swapped at some stage—drives A and B are not interchangeable. If for some reason they have to be interchanged then a jumper block has to be swapped, as well as the terminator pack.

Be careful when handling the data cable connector, as the tiny plastic orientation tab is easily misplaced, creating the danger of plugging the cable in backwards.

Another potential problem has been inadequate tightening of the shaft of the head positioning stepper motor to the stepper assembly. A small Allen screw on the shaft fitting has to be very tight, or the head does not step fully. This problem can take considerable finding, as the head appears to move in response to disk access commands. The best way to check it is to move the head mechanism by hand. If the 'steps' of the stepper motor cannot be clearly felt then the shaft is slipping. The drive will probably have to be realigned after tightening the shaft mounting screw.

The second change in the newer models is in the operating system. The code to turn the disk drive motors off has now been put at the end of the disk access routines instead of at the start of the keyboard input routine. This means that the drives now turn off during any pause—not just when the machine is waiting for operator input. This is particularly useful when doing long loads or dumps at 300 bd, or when reading the screen after the Perfect Writer 'D' command!

The other major change is that the procedures to format, copy and SYSGEN a disk have been completely rewritten. All these procedures are now combined into one program, so all three

can be executed by selecting a single option from the main menu. In addition, when a disk is SYSGENed the program will provide an option of inserting an auto-start facility. If this option is used then the nominated program will be run whenever the disk is inserted in drive A and cold-booted. For first-time users this makes the setting up of the system very easy.

All the original options of copy and format (and others) are available through an 'expert' option in the new copy program.

There may well be other changes in the operating system, but they do not appear to be significant. Incidentally, it turns out that LADDER and CATCHUM are written in compiled Microsoft BASIC-80. I knew the compiler was fast but I didn't suspect it would be capable of that kind of screen display on a machine running at 2.5 MHz.

Additional Software

Another addition to the standard set of software is a package called UniForm from Micro Solutions. This package permits the Kaypro to format and use disks in Osborne 1 (SD and DD), Xerox 820 (SD and DD) and TRS-80 Model 1 (SD) formats. The disk in the alternative format can only be used in drive B and cannot be used by COPY, but the programs are very useful for transferring software from one disk format to another. The programs are easy to use and the short but adequate instruction sheet is a model of clear, precise expression.

The manual for S-BASIC has been extensively revised, but it is not much of an improvement over the original. The printing is better and it now has a table of contents and an index, but the organisation is not improved and it is still not complete.

For example, the table of run-time error codes is in the section entitled 'CONTROL STATEMENTS', and the only explanation for the STOP statement is that it is the same as END, which it is not. The statement summary is in no logical order and the additional text seems to be written by someone for whom English is not the first language.

The only significant addition to the manual is a 30-page Beginner's Section, which introduces both the procedures of compilation and the keywords of S-BASIC in a logical, step-by-step manner. Although it contains errors and fuzzy statements it should be some help to the beginner. □

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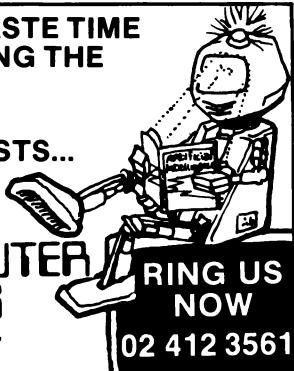
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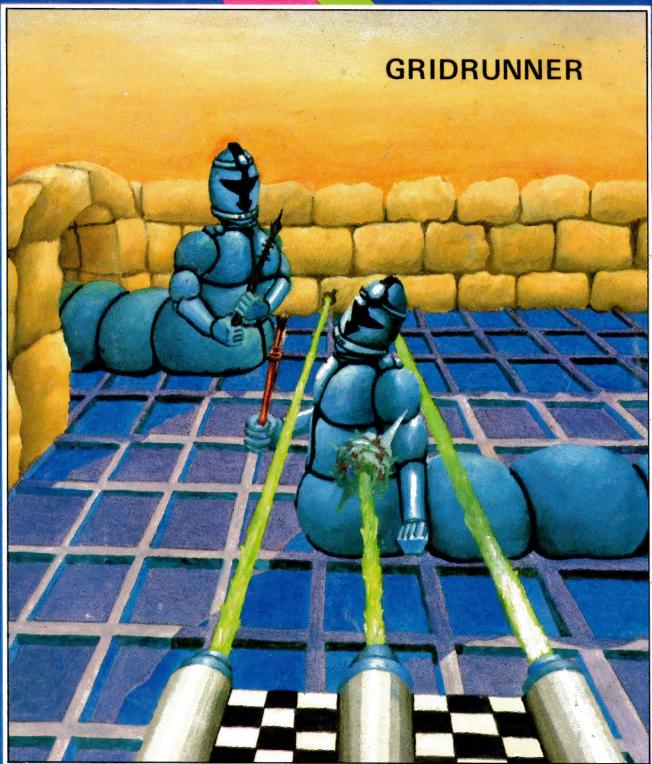
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